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Matthew Maty MD, FRS (1718–76) and science at the foundation of the British Museum, 1753–80

A. E. Gunther

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Part I

Introduction

Among those who were concerned in its early years with the foundation of the British Museum in Montagu House, Matthew Maty probably had a wider circle of acquaintances than almost any of the other officers. As a physician he was a member of a medical club with wide contacts in the scientific world. As the editor and largely the author of the *Journal Britannique*[1] he was the centre of a large intellectual circle in England, Holland and France. He also belonged to a club which included the leading literary figures of the day. Through his father he became known to the ministers of the Huguenot Church and having been both Foreign Secretary and Secretary of the Royal Society he was informed of the current opinions of the scientific world.

Maty's life was chosen for study because of the ubiquity of his contacts and because it illustrates the social background against which the British Museum came into being. The valuable study of the *Journal Britannique* made by a Dutch scholar, Dr U. Janssens-Knorsch (1975), complements this work. Dr Janssens-Knorsch's approach is from a literary viewpoint and throws light on Maty's influence through the *Journal*; the present study focuses on Maty's work at the British Museum against the background of its eighteenth century science.

The period 1720–80 which spanned almost exactly the life of Matthew Maty was exceptional in English history. It derived from a unique set of historical conditions unlike any that could have existed before, or that could exist again. It lay between the religious turmoils of the seventeenth century and the troubles attendant upon industrial growth extending into the nineteenth. By the start of the eighteenth century the constitutional disorders of the period of the Stuarts had run their course, to be followed by 20 years of adjustment under the leadership of Robert Walpole, the so-called Walpole's peace of 1721–42.

There was also a time lag of about half a century from the acceptance of scientific thought, seen in the foundation of the Royal Society in 1662, and in the philosophy of Newton and Locke, before the reasoning of the natural philosophers seeped into the minds of thinking men, politicians, writers and men of wealth. The implications of the new science certainly altered the way men thought about the world, but it did not immediately affect their everyday lives. Mid-eighteenth century society saw itself as a classical age which had 'arrived', as it envisaged the Greek and Roman worlds it admired as having 'arrived'. It was seen as an age of permanence, the outcome of reason and experience, not merely as a passing phase in the course of history. Progress, of course, there was, but it related to the details of everyday life, to the improvement of the existing system and to the completion of knowledge. In a sense, men were unaware of the significance of the advances they were themselves making; they did not conceive themselves as the agents of the social and political upheavals of the last quarter of the century: in America in 1776 (the year of Maty's death), in France in 1789 and in the throes of the industrial revolution that emerged out of the Napoleonic wars.

It was Maty's achievement, in the six years of the authorship of his remarkable *Journal Britannique* to give us an insight, during the mid-century period from 1750 to 1755, of what people thought and of the period's changes and advances. By means of a review of the country's publications and literature hardly a facet escaped him of its activities, in religion as much as in science and society. Religion, for instance, had ceased to inflame men's passions, but the controversies between the deists and those who held to a natural religion continued to simmer among a handful of theologians. The writings of David Hume showed men the way they reasoned and led to their questioning and modifying their religious beliefs, in medicine, experience and medieval tradition. In natural philosophy the Linnaean system was bringing the appearance of order into nature. The view of the world, enlarged by conquest, was being made known by voyages of discovery which stimulated the whole field of science.

It was against this background that a group of eminent gentlemen, charged as Trustees under the will of the wealthy physician, Sir Hans Sloane (1660–1753), were inspired to support the founding of a British Museum as a repository for the national collections of books and manuscripts and for the preservation of objects and specimens with which to provide a basis for knowledge. That it was their privilege to create an institution destined to give an *active* lead in the advancement of science would scarcely have entered their minds.

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[1] Abbreviated to J.B. in text references.

The first two decades of the Museum's life, to the end of the 1770s, when it came of age, may be termed its formative period. It was a period of trial and error, and, all things considered, very little error. Such of the original Trustees, still living at that time, could reflect on having participated in an outstanding national achievement. However, it was an achievement shared by a group of very able men, the Museum's officers, of whom Matthew Maty (1718–76) was one. As a medical and literary man, he had prepared himself for the role as author and editor of an outstanding monthly journal, the *Journal Britannique* (1750–55), and, as a member of the Museum's staff, became Keeper of two departments and, in his last years, Principal Librarian.

Ancestry and education

Matthew Maty (christened Matthieu) was born at Montfoort, a little town near Utrecht, on 17 May 1718. He was descended both on his father's and on his mother's sides from distinguished French Huguenot stock which counted many protestant ministers (Mencheé, 1915). In 1685, after the revocation of the Edict of Nantes, which opened the flood gates of persecution for the French Protestant minorities, Matthew's grandparents had fled from France to Holland, settling in the Province of Utrecht. There, their son Paul (1681–1773) proceeded to a doctorate at the University of Utrecht, later adding the study of medicine and mathematics at Leyden.

In 1709 Paul Maty succeeded his uncle as minister of the Walloon Church at Montfoort and subsequently became catechist at the Hague. There the unsettling influence on an independent mind in a centre of government with an international, especially English, atmosphere, persuaded him to emigrate to England to join the Anglican church. Being unable to secure a footing in London, he returned to the Hague, where in 1729, he wrote a letter, in effect a tract of a hundred pages, which was to set the seal of his future: *Lettre d'un théologien à un autre théologien sur la mystère de la Trinité* (Maty, P. 1729) – maintaining that the 'Son and the Holy Spirit were two finite beings, created by God, who at a certain time became united to God'. This was at a time before the Dutch Reformed Church had moved from the rigidity of Cartesian philosophy and when it was held that every departure from orthodoxy was sinful and deserved the severest penalty (Mosheim, 1765). For this letter, therefore, Paul was dismissed his benefices and excommunicated by the synod of Campen and the Hague. When his appeals against the decisions failed, and he found no refuge in England, he moved in 1730 to Leyden where his brother Charles lived, a compiler of a greatly esteemed *Dictionnaire géographique universel*, Amsterdam, 1701 and 1723. Joining the Remonstrant Church, Paul Maty remained in Leyden, it is assumed, for the eight years of his son's eduction.

Matthew Maty entered the University of Leyden on 31 March 1732 at the age of 14, receiving an MD degree on 11 February 1740 and simultaneously a PhD for a philosophical thesis, *Dissertatio de consuetudinis efficacia in corpus humanum* (Maty, 1740). This was a dissertation on custom in society, later published as *Essai sur l'usage* (Maty, 1741). The intellectual environment of his family circle during the impressionable years of adolescence and his ability to master whatever was put before him, would acount as much for Matthew's philosophical attitudes as for the uncommon range of his interests. It was certainly no purely theological or medical environment in which he was brought up.

In the 1730s, a foreigner looking across from Holland at the English scene found much to wonder at. After 20 years of Walpole's peace (1721–42) and freedom from external war, the condition of the country was as favourable to attracting a dissenting minister and a young doctor as any country in Europe. While catholics, non-conformists, Jews and Quakers were denied certain elementary rights, religious freedom had become an unquestioned English principle. Even writers and pamphleteers could say what they liked without fear of persecution, and both father and son were by inclination writers.

After his visits to London, Matthew's father was determined, following his excommunication, to shake the dust of Holland from his feet at the first opportunity. So with the completion of his son's education he made a permanent home in England. Matthew Maty arrived in London with his parents towards the end of 1740, and they settled in their first residence in Holler Street, Soho.

Medicine in London

A young physician like Matthew Maty, with an education acknowledged superior to any he could have got at the time in England, would have been aware of the move in medicine away from the scholastic traditionalism of previous centuries into the application of ideas derived from practice which was being widely supported by large scale philanthropy. By 1741, four of London's hospitals had already been built (Westminster 1719, Guys 1724, St George's 1733 and the London Hospital in 1740), and another three were planned (Foundling Hospital 1743, Middlesex 1745 and the Small-pox Hospital in 1747). The first lying-in hospital opened in 1739, and by 1741 William Smellie (1720–95) had started teaching midwifery (George, 1925: 60). In the reign of George I, the medical profession, from the influence of Thomas Sydenham (1624–89), Sloane's mentor, had acquired a greater esteem and enjoyed a greater affluence than it had ever done, benefits it was not to lose that century. Leading physicians could earn the not uncommon remuneration of £10000 a year, an immense sum in those days; Sir Hans Sloane was the first physician to receive a knighthood.

That Maty held a medical degree from the University of Leyden was something to be proud of as well as of some consequence for his future. At that time the conditions of medical teaching in England, Scotland and Ireland was such that many students went to study at Continental universities. Some went there because, not being of the Church of England – Non-Conformists, Catholics, Jews – they were excluded from Oxford or Cambridge; others because of the reputations of Paris, Leyden, Rheims, Montpellier, or Padua; and others still for financial reasons.

From about 1700, however, British students gave preference to Leyden on account of the teaching there of Professor Herman Boerhaave (1668–1738), and in the next 38 years, until Boerhaave's death, no less than 746 English speaking students, mainly 'Angli, Scoti and Hiberni', but also students from the British colonies, New England and the West Indies, either matriculated, studied, took their degrees, or pursued post-graduate study at Leyden (Underwood, 1977). The influence of Boerhaave's pupils, for instance, was such that the Edinburgh School was founded by them; and Boerhaave's reputation today is that he was the greatest teacher of medicine the world has known. Therefore, a Dutch physician, newly qualified, who had studied under Boerhaave, could not only claim the value of the master's personal inspiration, but would have found in England many doctors, also his pupils, who were amicably disposed towards a young Leyden graduate.

Given the necessary introductions, an attractive and intelligent young man from Leyden would have had little difficulty in building up a private practice. Of this, however, we know very little and virtually nothing until the 1760s. As a foreigner with a diploma from the University of Leyden, Maty could work under a 'bishop's license', given by a bishop on the recommendation of four physicians and without resort to the licentiate of the College of Physicians (not yet the Royal College). Nominally that excluded him from an area with a radius of seven miles from London (Clark, 1964). But the shortage of qualified doctors then was such that the College could not have improved the situation by seeking powers to make graduates qualify for its licentiate, even if they breached the seven-mile rule as Maty did.

The position at that time was that only the well-to-do could afford a doctor at all. Most people called in an apothecary as a first step, and a doctor only as a second. The average apothecary had no other training than in the composition of drugs, so quacks abounded and made a good living. To judge by his later practice, the impression is that Maty worked among the well-to-do. There was, of course, a sizeable French speaking colony in London, including Huguenots who were settled in Soho, then a fashionable parish. There was probably work at the French Hospital to which, at the end of his life in 1774, Maty was elected an honorary physician. For the rest we must depend on what we can gather from his practice in the 1760s which will be mentioned later.

The Medical Club

It must be assumed that Maty came to London with the express purpose of earning his living as a physician, and therefore it is unfortunate that his first ten years as a doctor should have been so completely overshadowed by the literary period that followed. However, a young doctor in new surroundings would naturally be drawn to any circle that shared something of his experience. On his arrival in London Maty was introduced to what came to be called the 'Medical Club', but we do not know by whom. In it he found a group of doctors not much older than himself who were to become eminent in various ways and even internationally distinguished. The Club met on every other Thursday at the Queen's Arms of St Paul's Church Yard (Nichols, 1812–15, **3**: 258) and there drank coffee and exchanged medical and other gossip. Since several of its members did much to help establish the British Museum in Montagu House, a brief introduction to each is required.

It seems likely that the Club's existence was due to Dr John Fothergill (1712–80), an Edinburgh graduate who had just arrived in London and who was to succeed Hans Sloane and Richard Mead as one of the great figures in British medicine. However, when it comes to natural history in the British Museum or elsewhere, with Fothergill one must always associate **Peter Collinson** (1694–1768) (Hunt, 1887), an older man who, although not a physician and not at that time a member of the Club, was a great influence in natural history circles, and a pillar of support in Museum affairs.

Both Collinson and Fothergill were of Quaker stock and both maintained the Quaker habit in their lives. Both had ancestral roots in the English hill country; Collinson in the Fells of Cumberland; Fothergill in the farm lands of Wensleydale, Yorkshire. Although Collinson was a trader, having inherited a wholesale business in men's mercery, botany was his passion. Trade with New England and Carolina brought wealth and enabled him to receive collections of plants by the American naturalist, John Bartram (1699–1777), who also enjoyed Fothergill's patronage.

By this means many new kinds of trees and shrubs were brought over to grace the estates of the English landed gentry. As a young man Collinson's knowledge of botany enabled him to help Sloane arrange his collections and in later years he was one of the few who could call on Sir Hans familiarly at any time. As one of the trustees of Sloane's will he would have welcomed an appointment as curator of the botanical collections at Montagu House, and although disappointed in this, he never ceased to support the Museum through interest and with many gifts over the years.

John Fothergill (Hird, 1781; Lettson, 1786) founded his first club among the medical students at Edinburgh, and, graduating in 1736, assisted Professor Alexander Munro edit a work on osteology (Munro, 1746). Being too late to join Boerhaave at Leyden, Fothergill worked under Sir E. Wilmot (1693–1786), Mead's son-in-law at St Thomas's Hospital. Before engaging in practice in the city, he spent two years in clinical practice among the poor, for it was the poor, he said, who taught him medicine. He was one of the pioneers who helped free English medicine from the hold of the scholastic tradition by encouraging nature herself to effect the cure (Payne, 1889), and made an international reputation through the treatment of *angina maligna* of which an epidemic swept the country in 1747.

A friendly and generous man, Fothergill attracted others to himself. Apart from his students' club and the Medical Club of 1741, he started a Medical Society (of Physicians) in London in the 1750s, and helped found the Society of (Licentiate) Physicians in 1767. Wealth brought him into collecting, his cabinet of shells being outstanding; he supported his naturalist friends in assuring the publication of their work. With Collinson's help he established a garden of 30 acres at Upton, Stratford, to the east of London, which Joseph Banks rated as the best in the country after Kew, and without an equal in Europe (Fox, 1919: 184n). To the Museum he was liberal in his gifts; and when Dr Gowin Knight, the Principal Librarian, suffered from an unwise investment Fothergill relieved his anxieties to the tune of £1000, a debt never repaid. Although Fothergill did not himself lend a hand at Montagu House he was a power in the medical and naturalist worlds.

William Watson (1715–87) (Hartog, 1899) was one of the brilliant scientific men of that century. Son of a tradesman of Smithfield, East London, he went to Merchant Taylors' School and was then apprenticed to an apothecary. He won a prize awarded by the Apothecaries Company and may first have met Sloane there. Elected to the Royal Society at the age of 26 he had charge of the Society's classical experiments into the nature and conductivity of 'electric fluid'. Later, in 1751, he introduced the results of Franklin's electrical experiments to the Society. In the field of natural history he showed that coral was of animal and not of vegetable origin and his review of Linnaeus's *Species plantarum*, Holmiae, 1753 in the *Gentleman's Magazine* of 1754 did much to make the Linnaean system acceptable in England (Watson, 1754).

In the meantime Watson advanced his qualifications as physician and surgeon. He became a public authority on poisoning by non-edible plants. In 1757 he was awarded a doctorate in physic at the universities of Halle and Wittenberg. The licentiate of the College of Physicians followed in 1759, when he moved from Aldersgate to practise from Lincoln's Inn Fields. In 1762 he was appointed physician at the Foundling Hospital. In 1768, in a paper read before the Royal Society, he advocated the method of inoculation against small-pox he had applied for 20 years.

Numbered among Sloane's executors, Watson's election as one of the first Trustees of the British Museum was an enormous benefit to the new institution. With the exception, perhaps, of Thomas Birch, few others gave as much time as he did, and he furnished the Montagu House garden with many plants. Knighted only a year before he died, he is held in respect by the surgeon's title of 'Mr'.

Peter Templeman (1711–69) (Thompson, 1898) came from a well-to-do family and so received, as did few others in this story, a formal education at Charterhouse, Cambridge and finally Leyden under Boerhaave, for an MD. At Leyden Templeman struck up a friendship with Maty whom he may have brought into the Medical Club. As a gentleman of means, Templeman decided on life of literary leisure on the fringe of medicine (Templeman, 1753). It may have been Maty's influence that led to Templeman's appointment, in 1758, as the first Keeper of the Reading Room at Montagu House, but neither his inclinations or his health survived the conditions of employment for more than a year. From 1760, as Secretary of the Society for the Encouragement of Arts, Manufactures and Commerce (later the Royal Society of Arts), having close ties with the Museum's staff, he found scope for his talents. The respect with which he was held is confirmed by the portrait in the Society's house.

Another of the physicians in the Medical Club was **James Parsons** (1705–70), an obstetrician of ability and versatility, who moved among the intellectual elite of his day, numbering bishops among his friends. A strong mystical element in his nature, derived, perhaps from years of adolescence in Ireland, led to unusual philosophical conclusions on such subjects as hermaphrodites, the differences between plants and animals, and the origin of languages. Less would be known about him were it not for an éloge Maty wrote for Nichols's *Literary anecdotes* on his death (Maty, 1812). Maty succeeded Parsons as foreign secretary of the Royal Society. However, there is no record of Parsons's interest in the Museum's foundation or that he was in any sense a benefactor.

In receipt of patronage

In the eighteenth century any young man without social connections who aspired to a position in society depended on patronage, and Maty was no exception. The opinion has always been that Maty was the recipient of favours from Lord Chesterfield (1694–1773), politician, diplomat and the author of the famous *Letters* to his son but what it was that inspired the patronage or what form it took has never been revealed. If, however, the evidence put forward here remains circumstantial, it fits both Chesterfield's temperament and not only Maty's desire for reticence, but also his wish indirectly to acknowledge Chesterfield's friendship.

In 1728 Lord Chesterfield was appointed ambassador to the Hague, then incidentally, the most important post on the Continent, and he remained there until 1731. While there, it is likely that he would have heard of the prevailing ecclesiastical *cause célèbre* involving Paul Maty's excommunication by the Synod. With Maty going to and fro between the Hague and London, it is probable that the two met, and a meeting may have included Matthew Maty, then a boy of 12. There could hardly have been another circumstance to account for the warmth of Chesterfield's welcome to Matthew and his parents when the family arrived in London in 1740:

> . . . il recut un accueil distingué de célèbre Chesterfield qui ne néglige rien pour lui rendre agréable séjour de Londres. (Michaud, *Biographie universelle*, 1810–28

The impact on his lordship of an intelligent and agile minded young doctor with all the social graces could very well have prompted Chesterfield to intimate to his principal physician, Richard Mead, that here was a friend for whom something should be done. This would give meaning both to Maty's phrase in his essay on Boerhaave (Maty, 1747: 39) and to the compliment he paid to Richard Mead in *Authentic memoirs* (Maty, 1755(a): i–ii)

> . . . the friendly protection of some eminent brother of the faculty assisted him to force his way through the crowd. (*Éloge Critique de H Boerhaave*, p. 39)

> . . . ingenious men 'were sure to find' the best help in all their undertakings. (*Authentic memoirs of Richard Mead*, p. i–ii)

The first of Maty's bows to Lord Chesterfield is taken to be the dedication of his *Ode sur la Rebellion de MDCCXLV en Écosse* (Maty, 1746) to M.L.C.D.C. (Monsieur le Comte de Chesterfield). This is a long, rather heavy poem which tells us something of the author's political and religious position at the time of the Rebellion of 1745 which Maty might have thought it good for his patron to know.

In the later stages of Maty's career it was less Lord Chesterfield who provided the cloak of patronage to Maty's ambitions, than Lord Hardwicke, the Lord Chancellor, doubtless prompted by Thomas Birch. But Maty was never neglectful of what Chesterfield had done at the start of his life in England or failed to take the occasion to make some indirect reference to it. The climax of Maty's acknowledgement of Chesterfield's patronage was, of course, his memoirs of Chesterfield and editing of his *Miscellaneous works* through which he has come to be principally known (Maty, 1777).

The social circle

At the time that Maty was first established in London the city contained a distinguished coterie of scholars and scientists. Of those in the Medical Club, Parsons and Watson had been newly elected to the Royal Society. One of the first calls any foreigner made on arriving in London was on Richard Mead, as celebrated as a collector of antiquities and for the patronage of scholars, as a physician. Sir Hans Sloane had just moved with his collections to Chelsea, another common port of call. Among the naturalists were several Maty was to work with while at the British Museum: George Edwards (1694–1773), ornithologist and Sloane's confident in his last years John Hill (1716–75), apothecary and writer, Henry Baker (1698–1774), microscopist, Dru Drury (1725–1803), entomologist, John Ellis (1710–76), a close friend of Peter Collinson's, who did much for the British Museum in its early years, and the impecunious Emanuel Mendes da Costa (1717–91), another recipient among many of Fothergill's charity (Whitehead, 1977: 9).

A mathematician to come into Maty's circle through his father, was the Huguenot, Abraham de Moivre (1667–1754) (Clerke, 1894), one time tutor to several distinguished men of the day, Lord Chesterfield, Lord Macclesfield and others who were concerned with the Calendar Act of 1750 (de Morgan, 1857). In 1712 it had been de Moivre's privilege, as a friend of Newton's, to be appointed by the Royal Society to arbitrate between Newton and Leibnitz on the claim to the priority of the invention of the infinite calculus. It was Maty's privilege to write de Moivre's *Mémoire* (Maty, 1755(c)).

Another of Maty's early friends, neither physician nor scientist, but like himself with Huguenot roots, was John Jortin (1698–1770) who became eminent as an ecclesiastical historian. We do not hear about him until later, but it is likely that they met when Jortin, after Cambridge and with Anglican Orders (although a dissenter by temperament), was occupied as Reader and Preacher at the Chapel-of-Ease at St Giles-in-the-Fields, a stone's throw from the Maty home. There he wrote *Miscellaneous observations upon authors ancient and modern*, 1731. In 1747, having been appointed to another Chapel-of-Ease, at Oxendon Street, he came under the jurisdiction of Archbishop Thomas Herring, whose friend he had been at Cambridge and while there he was, incidentally, offered a living in the City by Lord Hardwicke. But he remained at St Giles to issue the first three of five volumes of *Remarks on ecclesiastical history*, 1751–54, which, given five review articles by Maty in the *Journal Britannique*, (J.B. **8, 9, 14**) also brought him a Lambeth degree, an honour given generally for services to the Church at Lambeth Palace. His *Life of Erasmus*, 1758–60, established his European reputation, but most of his later writing was on classical subjects, and he contributed several articles to Maty's *Journal Britannique*. He also wrote on music and played the harpsichord. Twenty years older than Maty he was Maty's most intimate, and certainly most interesting friend and probably the centre of Maty's circle. His son Rogers, married Maty's eldest daughter, Louise.

By joining Jortin's ecclesiastical circles Maty met a bishop or two, such as William Warburton (1698–1779), Bishop of Gloucester, who, a ready debater, might have expressed views about pastors who quarrelled with their Synod. There were bishop-antiquarians like Charles Lyttleton (1714–68), Bishop of Exeter and Carlisle and President of the Society of Antiquaries, and the William Stukeley (1687–1765), knowledgeable on Druidism and with a reputation for archaeological misinterpretation, all of whose works Maty was later to review in the *Journal Britannique*. There was also Martin Folkes (1690–1754), the numismatist who had succeeded Sloane as President of the Royal Society and who was to support Matys election ten years later.

The Maty family

Coming with his family to London, Matthew Maty was fortunate in being able to enjoy the benefits of family life surrounded in Soho by many Huguenot friends (Janssens-Knorsch, 1975). Within that social circle he met Elizabeth de Boisragon who became his wife on 13 December 1743, at the Spring Garden Chapel in Soho. A year later, their son, Paul Henry (1744–87) was born; there were two daughters of the marriage. In 1767, the second, Anne Gilette (b. 1748) married John Obadiah Justmond, FRS (1723–86) who held an appointment in the British Museum. The elder daughter, Louise (1746–1809) married Rogers Jortin (1732–95) the son of Maty's friend, in March 1776, four months before her father's death.

In 1750, Elizabeth Maty died, but in 1752 Maty married the English gentlewoman of Huguenot descent, mentioned by John Jortin in his letter of 1756 to Lord Hardwicke, quoted later, namely Mary Dolon Deners by whom he had a daughter, Marthe, born in 1758. In 1752 the Matys moved from Holler Street to Frith Street, also in Soho, and into Montagu House in the summer of 1756.

It is assumed that the Maty family worshipped in one of the small chapels in Soho belonging to the Huguenot church of the Savoy, or in the chapel in Oxendon Street, near Leicester Square, where the memorial service for Matthew Maty was held on 11 August 1776. It is assumed that the Paul Maty, Matthew's father, lived with his son up to the date of his death on 21 March 1773.

Part II

The *Journal Britannique*, 1750–55

After the best part of a decade as a practising physician in London, occupying his spare time in journalism, Maty evidently decided that literary life offered at least as much satisfaction as routine medicine. He may also have realized that it was not as a doctor that he would secure the niche in society his particular talents justified. It must also have been evident to him since his student years, especially since the completion of his doctoral thesis, that routine work was not really in his line even if it had the advantage of giving leisure for the scientific interests that occupied his medical friends. As far as his education was concerned his range of knowledge covered at least as wide a field as that enjoyed by any of his English contemporaries. The anonymous sketch of Maty's life in Nichol's *Literary anecdotes* made it clear that his incursion into a highly specialized form of literary journalism was aimed at securing him the place in society to which he felt himself entitled (Nichols, 1812–15: **3**, 258). The means to this end was through the publication of a *feuille volante* called the *Journal Britannique*.

A study of the 18 volumes of this *Journal* issued in the six years between 1750 and 1755 – before he joined the British Museum in 1756 – is essential for understanding the man's ability and what he sought to make of his career. Janssens-Knorsch's work on the *Journal Britannique* (Janssens-Knorsch, 1975) although its approach differs from that of the author's, has been available and of very considerable assistance.

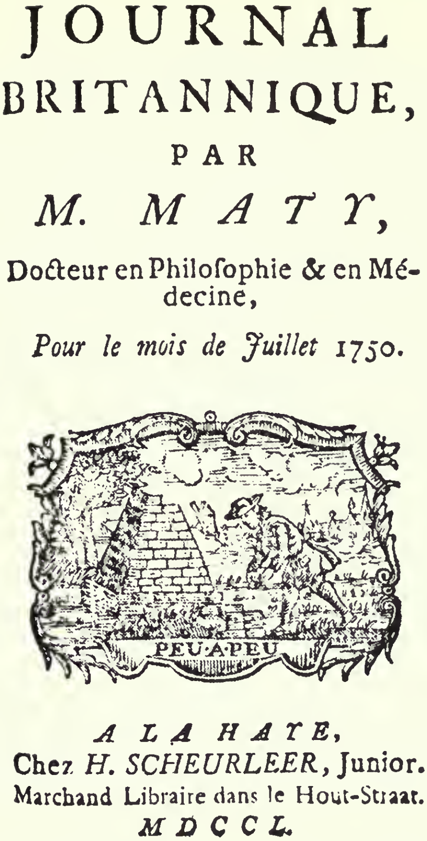
The emergence of London as one of the centres of European culture, as well as of the constitutional, economic and literary developments in England, led to the posting there of literary journalists who reported back to their capitals, and particularly to Paris. Maty had not been long in London before he made contact with a group of French journalists who were engaged to supply news of a literary nature to French periodicals, published on occasion in Holland. He was invited to join them at their gatherings of what had grown into a sort of literary agency at the Rainbow in Marylebone, an eighteenth century coffee-house. It was not long before he was contributing pieces both to the *Bibliothèque Britannique* (1733–47) and to the *Bibliothèque raisonée des ouvrages des savants de l'Europe* (1728–53) and especially to its *Nouvelles de Londres*.

In 1747, after 14 years, the *Bibliothèque Britannique* ceased publication, not from lack of demand but from lack of a competent editor. By that time Maty had become sufficiently involved in its affairs to realize that there was a future for a journal of that type. He must have wondered whether the editing it needed could be done in his spare time from medicine. It could be that pressure came from the Hague. An anglophile publisher there, Henri Scheurleer, whose father may have been an old friend of the Matys and who was eager to improve his trade in English books, may have made the first approach. The suggestion, by analogy with the arrangements of other journals, was that a successor to the *Bibliothèque Britannique* should be financed, printed and distributed by a publisher, and that Maty should provide the text as the London editor. It was an ideal arrangement for Maty, giving him an independent entrée into journalism and a fee of £12 a month.

In the year or so before the issue of the first number of his *Journal Britannique* in January 1750, Maty evidently gave much thought to its content and format. Its aim was defined in a *Project* in the first number, and later outlined elsewhere:

> The design of the *Journal* hath been, to do justice to English writers, who make a considerable figure in the Republic of letters; to assist in spreading their reputation abroad; and to give a fair account of their work without censorousness or adulation . . . (Maty, 1755(a): i–ii)

Since its predecessor had failed because it was a group effort, Maty decided his must be an individual one if only 'pour penser avec liberté il faut penser seul' (J.B. **1**: iv). To control content, policy and style he would himself be the principal contributor, compiler, editor and



JOURNAL
BRITANNIQUE,
PAR
M. MATY,
Docteur en Philoſophie & en Médecine,
Pour le mois de Juillet 1750.

A LA HAYE,
Chez *H. SCHEURLEER*, Junior.
Marchand Libraire dans le Hout-Straat.
MDCCL.

Plate 1 *Journal Britannique*, Title pages, 1750.

translator, but not an anonymous one. Outside contributors were welcome, but whether they wrote in English or French he would himself translate and edit their texts to his pattern. He would avoid the tediousness of the current reviews, which generally comprised long transcripts of the authors' text, by giving his own opinion. For his precedents, he would go back to the original thinkers of the previous generation, Pierre Bayle (1647–1706) and Jean de Clerc (1657–1736) who had inspired the encyclopaedists.

The format the *Journal Britannique* took was pocket size (12 mo, 13 × 7·5 cm), of between 120 and 140 pages, printed in largish type (180 words to a page) (Plate 1). At first it appeared monthly, but after two years (April 1752), every other month, which, although doubled in volume, it gave the author more time for reflection. The early numbers were divided into four to six sections (the later into a dozen or so), being articles or reviews of 20 to 30 pages each. In each number a final section, *Nouvelles Littéraires*, contained advance notices of books to be reviewed and notes from the universities: of Oxford, Cambridge, Edinburgh, Glasgow, Dublin; also more general news from London, or any other stray bits and pieces, grave or gay, that took the editor's fancy. In the six years of the *Journal*'s life 18 volumes of about 8000 pages were produced.

The volumes contain a total of about 320 articles. Although Maty was in principle both author and editor of the *Journal*, he sought collaborators, usually identified by initials. These appear to have contributed about 100 articles, leaving the balance of some 220 to Maty himself.

As an index of Maty's social circle in these years it is interesting to see who his collaborators were (Appendix 1a and b). There were first his medical colleagues and others, some of whom were Fellows of the Royal Society. Those closest to Maty in these years were members of two groups, so-called Clubs, each of a handful of members. The more important was a Society of Gentlemen, admirers of Thomas Birch (1705–66) who joined in a fortnightly Thursday tea-party, which Birch called his 'Bibebum Theum'. Among them was John Jortin whose articles on classical literature found a regular place in the *Journal*.

The other group was formed of a dozen or so Huguenot ministers (including Maty's father) attached to the French Church of Savoy which also met on Thursdays every other week. For theological articles it was natural that Maty should turn to his friends in this private Soho 'Synod'. For mathematics he leaned on his father, who could hold his own with any of the leading English mathematicians. The 65 contributions of this group, were signed by initials only, as were those of two others (J.J. and E.M.) not certainly identified.

To analyse the reviews and articles which comprise a large part of these 18 volumes, Janssens-Knorsch has found it necessary to make a modern re-classification of the eighteenth century subject matter, since in 200 years subjects change their status; earthquakes or the age of the earth, for instance, no longer belong to theology. An analysis of the 320 articles also showing Maty's personal contribution to the *Journal*, would read:

Subject	**Number of reviews/articles**	**Maty's contribution**
Literature	77	64
Theology	59	20
Natural history and science	57	57
Medicine	33	24
History	23	*c.*12
Philosophy	19	7
Antiquities	16	10
Law, institutions and commerce	11	*c.* 6
Geography and travel	10	9
The arts	5	4
Miscellaneous	13	13
	323	226

The 50 *Nouvelles littéraires*, with notices of 600 titles, are not included in these figures.

A further general analysis of the whole range of Maty's involvement with the *Journal* would duplicate that of Janssens-Knorsch. Instead, those aspects of science and medicine with which he was personally concerned are discussed in the following sections.

Science: medicine and natural history

The *Journal Britannique* did not seek to impose science on its readers beyond what the majority could understand, that is to say except for the complexities of mathematics, which drew protesters from correspondents. Could not the learned editor please consider their limitations? The Royal Society's *Philosophical Transactions* provided the basis for most of what was included since there was little that was new in medicine, natural history or antiquarianism (even on occasions travel) that, at that time, was not first presented to the Society. In the first number of the *Journal* published in January 1750 the *Philosophical Transactions*, 1747–48, were given a full review, and in the second number a leading article appeared on the relation between the foul air from ships and scurvy in which Maty took the opportunity of quoting medical opinion from Boerhaave, Mead, Watson and others. The names of his friends feature prominently in his texts. Thereafter there was scarcely a number that did not include something originating from the *Philosophical Transactions*, if only a snippet in the *Nouvelles littéraires*. The *Journal* included 15 full length review articles of the *Transactions* published between 1747 and 1754.

What strikes the reader of eighteenth century science today is the chasm separating it from what we take for granted in our every day lives. In mathematics Newton had done something to bridge the gap. In medicine and the natural sciences the middle of the eighteenth century stood as a watershed between the acceptance of classical and medieval lore and the advance to scientific method. The men whose work we read of in the *Journal Britannique* were feeling their way, often with an extraordinarily sure instinct, towards discoveries that came only in the next century. Maty's treatment of science against the background of the period must have done much therefore, to hold the interest of his readers at a time when revolutionary changes were taking place.

Medicine

In medicine the name to appear most commonly in the *Journal* is that of the physician Richard Mead (1673–1754). Maty's personal interest lay in Mead's friendship with Hermann Boerhaave (1668–1738) at Leyden when Boerhaave was still a student of theology; also in Mead's early acceptance of the value of inoculation against smallpox tested in 1721 on condemned prisoners in the Tower of London before being applied the next year to the daughters of the Prince of Wales, Amelia and Caroline. In 1751 Mead, as President of the Royal Society, supported Maty's election.

Volume one of the *Journal* was just in time to review Mead's *Demoniacs* in his *Medica sacra*, 1749 and his *Monita et praecepta medica*, 1751, the last of his writings (J.B. **5**). The *Medica sacra* drew a riposte from Thomas Church (1707–56), vicar of Battersea and Prebendary of St Paul's, in a paper adorned with a title typical of the period and making further study superfluous:

> A vindication of the miraculous powers which subsisted in the three first centuries of the Christian Church . . . With a preface containing some observations on Dr Mead's Account of the Demoniacs in his new piece intitled *Medica sacra*. (J.B. **1**)

After Mead's death in 1754, Maty wrote an obituary, *Éloge du Richard Mead* based on material supplied by Thomas Birch, (Herring, 1777: 159–61) of which, much to the author's satisfaction, an English translation was called for. This was concluded with the long Latin inscription on Mead's tomb in Westminster Abbey (Maty, 1755(a)). The last number of the *Journal* was concerned with the sale of Mead's Musaeum Meadianum, a discourse on the Cabinet of Richard Mead, described in a catalogue of 262 pages (J.B. **17**).

In medicine the *Journal* was largely concerned with the problems of the army and navy of a country intermittently at war, and losing more men from disease in peace-time than ever died fighting. The investigations of two Scotsmen, John Pringle (1707–82) and James Lind (1716–94) showed where the deficiencies lay. From 1742 to 1748 Pringle was attached to the army in Germany and Flanders (he was at Culloden in 1746), and his *Observations on the diseases of the army in camp and garnison (sic)*, 1752, (J.B. **8**) proved the benefit of antisepsis, sanitation and ventilation in saving life whether in hospitals or in camp. He was a remarkable man who could maintain contact with the commanders on both sides of the battle lines and persuade them that hospitals should be regarded as outside the area of conflict, as they have since remained. Pringle became President of the Royal Society, supported Maty's election, and in 1752 received the Copley Medal awarded by Sir Hans Sloane.

These and other medical topics summarized in the *Journal* from published works, generally without comment, can now be seen as revolutionary steps in military medicine. Lind's *Treatise of the scurvy*, 1753, (J.B. **13**) a disease then associated with Samuel Sutton's *Extracting foul air* *from ships*, 1749, (J.B. **1**) was the outcome of service with the fleet under the worst possible conditions in the Channel, Mediterranean and the West Indies. He showed that scurvy could be prevented by taking orange and lemon juice, but it was 45 years, in 1795, before the Admiralty insisted on the addition of lemon juice to the rations. That lack of ventilation was also the cause of several of the fevers of the time, including 'jayl' fever, was shown by a most original investigator, Stephen Hales (1677–1761), in a study of *Ventilation at Newgate Prison*, 1752, (J.B. **10**) later taken up by the Admiralty in the design of ships. The *Journal* also reviewed William Smellie's (d. 1795) fundamental *Treatise on the theory and practice of midwifery*, 1752, (J.B. **7**).

That by the mid-century the study of physiology within medicine was gaining ground in the universities is evident from the writings of two Scottish physicians, both pupils of Boerhaave. One was Thomas Simpson (1696–1764) the first Chandos Professor of Medicine at St Andrews; the other Professor Whytt, FRS (1714–66) at Edinburgh, both of whom investigated the involuntary response of animals independent of the brain (J.B. **10, 11, 18**).

Although the *Journal* was not usually concerned with current events it noted, in November 1752, that owing to illness Sir Hans Sloane had been unable personally to present John Pringle with his medal, and Lord Willoughby (d. 1755), the Vice-President stood in for him (J.B. **9**). The January 1753 number records Sloane's death and mentions his 'Cabinet d'histoire naturelle et d'antiquités', but not yet its destination (J.B. **10**).

Inoculation

In medicine Maty's record scarcely survives beyond his interest in the then not fully accepted practice of inoculation against smallpox. It was the one cause that brought all his talents together: a physician with literary gifts, a command of languages and socially conscious. These he applied in the *Journal Britannique* as a means of lifting a campaign for inoculation to an international level, a need greater in France than in England or Holland.

Maty seems to have contracted smallpox in 1740 shortly before he left Holland, and, treating it the 'natural way', survived – not the way, incidentally, Boerhaave advocated. Arriving in England he found that the leading physicians – Mead, Jurin, Sloane and others – accepted the practice even before 1721 when Lady Mary Wortley Montagu (1689–1762) had her children inoculated after their return from Constantinople. However, the public credit for having given currency in the west to the Middle Eastern practice of inoculation should rightly have gone to John Woodward, FRS (1665–1728) (Woodward, 1900), Gresham Professor of Physic, who advocated the practice in a paper read before the Royal Society in 1714 (Woodward, 1714).

Before 1752 the practice of inoculation was mentioned in the *Journal Britannique* only as items in the *Nouvelles littéraires* (J.B. **7**) but from then onwards reports about it came to exert a considerable influence, particularly in France, where the authorities had been unable to counteract public resistance. The pace was being set in England. On 5 March 1752, the Hospital for Smallpox was reopened on a new site at Cold Bathfields, and a sermon was preached by the Revd Isaac Maddox (1697–1759), Bishop of Worcester, at the Parish Church of St Andrew, Holborn before the President, his Grace, Charles Duke of Marlborough, the President of the hospital, the Vice-President and Governors. The acknowledgement of the work of the hospital by nobility attending the ceremony, the account of its work and the ample statistics provided impressed foreign observers (J.B. **8**).

The next items in the *Journal* which exerted an even greater impact, were two full length articles reviewing James Kirkpatrick's (1696–1770) *The analysis of inoculation, its history, theory and practice*, 1754. This recounted the author's experience when he was concerned with epidemics in South Carolina in 1738, and later in Ireland and Scotland in which of 4257 cases only 10 died (J.B. **13, 14**). This book roused the ire of the Rector of St Mildred and all the 'saints' in the City of Canterbury who, preaching on 'inoculation an indefensible practice' echoed the views of some medical men especially in France (J.B. **14**).

At this time there was still some question as to whether, if smallpox were contracted a second time, either naturally or through inoculation, it could be fatal. To resolve this, for there were few cases authenticated, Maty decided, without the knowledge of his family, to experiment on himself. Being called to treat a girl of five years he re-inoculated himself with her matter, and although he contracted the disease in its mild form it ran its usual course of ten days and left no after effects (J.B. **15, 16**).

By the *Journal Britannique*, Maty came into the forefront of the European campaign for the introduction of inoculation, through a lecture delivered on 24 April 1754 before the Royal Academy of Sciences in Paris entitled *Mémoire sur l'inoculation de la petite vévol* by Charles de La Condamine (1701–74), the celebrated mathematician, geographer and surveyor. He traced the origins and development of the practice of inoculation amongst the Georgians and in the Middle East, a memoir which Maty translated and published adding preface and postscript (Maty, 1755(b)). Then, to resolve various questions, Maty wrote to James Porter, (1710–86), Ambassador at Constantinople, for information of current practice amongst the Greeks and others which he recounted in a paper to the Royal Society on 10 April 1755 (J.B. **17**) (Maty & Porter, 1756).

La Condamine's paper was strongly attacked by Andrew Cantwell (d. 1764), an Irishman, with a degree from Montpellier who was practising in Paris. Although he claimed to have practised inoculation, he had turned against it, and in a *Dissertation sur l'inoculation*, 1755, opposed the measure with such vehemence and untruth as to rouse people to anger (J.B. **18**).

There were reactions to Cantwell's attack in Holland, Switzerland and later even in France. In Holland Charles Chais, pastor of the French Protestant church, St Evangile, at the Hague, contributed an outstanding paper to the Science Society at Haarlem (Chais, 1754) which dealt with the medical and theological aspects of the problem. In Switzerland a paper by Simon-André Tissot (1728–97) on *Inoculation justifiée*, 1755, appeared in Lausanne.

In England the effect of Cantwell's attack was to stir the College of Physicians to action. This was reported in a letter to Maty, as editor of the *Journal Britannique*, from the President of the College, William Heberden (1710–1801) and Edward Archer (1718–89), physician at the Smallpox Hospital. It informed him that on 22 December 1755 the College had, in a resolution passed unanimously, given unqualified support to the practice of inoculation, Archer's individual contribution being the hospital's most recent statistics. This resolution, published as an appendix to the Harveian Oration for that year filled three of the last pages of the final issue of the *Journal* (J.B. **18**), a fitting climax to Maty's efforts.

In France where in 1752, the publication of the *Traité de la petite vérole*, by the Geneva physician Jean-Antoine Butini, had been totally ignored, by 1755 the authorities caused an approach to be made to the College of Physicians in London. Ambrose Hosty, an Irish *docteur-régent* of the Paris Faculty made contact with Kirkpatrick and Maty for evidence which could be used to refute Cantwell's statements (Maty, 1756). In 1756 Hosty spent three months in London in discussions with Kirkpatrick, Maty and Bishop Maddox and witnessed over 200 inoculations at the Smallpox and Foundling Hospitals and in private. In spite of the uncertainties of the Seven Years War (1756–63) La Condamine visited London in 1763 and Maty returned the visit in the following year (Miller, 1957).

On 26 October 1764 Maty was in Calais, and from there he addressed a *Lettre de M. Maty . . . aux auteurs de la Gazette Littéraire* in which, to correct some impressions his correspondents held, he gave a historical review of the progress of inoculation in England since 1721 (Maty, 1764).

Although the close of the *Journal Britannique* deprived Maty of a medium of propaganda he continued to collect evidence in support of inoculation. As a result of enquiries by Charles Chais at the Hague, Maty gave a paper at the Royal Society on the ancient practice among the Arabs on the Coast of Barbary, in Bengal and in the East Indies (Maty, 1767). He also persuaded Angelo Gatti, Professor of Medicine in the University of Pisa, to publish in 1767 an essay, *New observations on inoculation*, including an account of the situation in France, which he translated and published in Dublin.

Natural history since David Hume

The writings of David Hume (1711–76), almost an exact contemporary of Maty's, had a far greater impact on human thought and on the intellectual approach of his generation than any philosophical system credited to him. For him the problem of knowledge lay in the human way of knowing and feeling. His first mature work, *An inquiry concerning human understanding*, 1748, ante-dated the *Journal Britannique*, and the *Natural history of religion*, 1757, appeared too late for review, but in 1751 Maty drew attention to the *Political discourses* (J.B. **5**) and to the *Enquiry concerning the principles of morals* the following year (J.B. **11**). The writings of a philosopher of even Hume's clarity and incisiveness could hardly be expected to turn the theologians immediately from their disputations – Hume had already disposed of miracles – but a man of Maty's worldliness and journalist's sense could see what lay ahead, and although religion continued to find a place in the *Journal* it figured less prominently than it had before.

Hume's empiricism had probably as great an influence on naturalists as on theologians, the former probing one aspect of nature, the latter another such as the age of the earth; and both find a place. The theologians were questioning Archbishop James Ussher's (1581–1656) biblical chronology between the Creation and Christ, of 4004 years, which had been inserted by an unknown authority in some editors of the Authorized Version 100 years previous, in 1654. The first of Maty's reviews examined the findings of the Revd John Kennedy (1693–1782), Rector of All Saints, Bradley, in *New method of scripture chronology on Mosaic astronomical principles*, 1751 (J.B. **8**) to be followed by the Revd. John Jackson's (1686–1763) two volumes of *Chronological Antiquities of the most ancient kingdoms, from the Creation of the World for the space of 5000 years*, 1752 – with tables, receiving three full length articles (J.B. **9, 10, 17**). Readers who enjoyed disputation by reverend gentlemen were not disappointed. Kennedy, in a letter pointing out the Jackson's errors (J.B. **10**) was joined by Baumgarten (1706–55), the German theologian (J.B. **14**). Finally a lay approach was made by Blair in *Chronology and the history of the World from the Creation to the year of Christ 1753*, 1754 (J.B. **14**). That Maty accepted a broad 6000 years since the Creation is suggested by a reflection in a review of the *Natural history of Barbados*, 1750, by G. Hughes:

> Il ya six-mille ans que la terre est habitée et la Terre n'est point encore connue. Seroit elle trop vaste? Ceux qui l'occupent manquent-ils curiosité, d'industrie or de patience? Humiliant problème! Que notre Siècle renouvelle des découvertes, que les ages précédents auroient du lui enlever. (J.B. **3**)

The *Journal* never failed to record eclipses and earthquakes, and if by then the astronomers had taken over eclipses from the church, earthquakes remained the church's charge for quite some time. When discussed by the antiquarian William Stukeley, Rector of St George's, Queen Square, his *Philosophy of earthquakes natural and religious*, 1750, showed them to be subject to cause and purpose (J.B. **2**).

> Can we deny then that [Hippocrates] here means a conscious and intelligent Nature, that presides over, and directs all things; moved the ethereal Spirit, or Fire, that moves all things; a divine Necessity, but a voluntary Agent, who gives the commanding Nod to what we commonly call Nature . . . (*Phil. Trans. R. Soc. Lond.* **46**: 749, 1750)

Until Maty took over the department of Natural and Artificial Productions in the British Museum in 1765, his concern with the subject appeared cultural rather than scientific. There is no evidence that he had practised the study of nature or had joined his naturalist friends in it. Natural history he described as '. . . la première et la plus universelle des Philosophes' (J.B. **9**) giving a longer definition in James Parsons' obituary:

> This amiable and interesting study, so congenial with human curiosity, so proportioned to human abilities, so necessary to human wants, is besides so intimately connected with physic, that it is almost impossible to cultivate the latter with any success, without at least having some tincture of the former (Maty, 1812).

However, Maty did not neglect the English works on natural history that did appear. The first to receive two full length reviews was George Edwards' *Natural history of British birds*, 1750 (J.B. **2, 5**) the author then being librarian of the College of Physicians. Less worthy than this was the *Natural history of fossils*, 1751, by Mendes da Costa (1717–91), which, treating a science scarcely in advance of geology, appeared the next year (J.B. **7**). There was also an extension of a popular series in John Hill's (1716–75) *Natural history of animals*, Vol. 3, published in 1752 (J.B. **9**) the previous volumes on fossils and plants having appeared since 1748. Well in advance of these was the work of John Ellis who was to help in the British Museum later and also become a benefactor. His *Essay towards a natural history of the corallines*, 1755, which showed zoophytes to be animals and not plants, was accorded two full length reviews (J.B. **16, 17**). The use of the microscope by naturalists was coming into fashion and was urged both by John Hill (J.B. **9**) and especially by Henry Baker (1698–1774) in his *Employment for the microscope*, 1753, a work of over 400 pages with plates (J.B. **10**).

The title of natural history was also given to the productions of amateur naturalists equally concerned with history, geography and sociology, such as Richard Barton's *A natural history of Loch Neagh*, 1751, (J.B. **5, 6**), and the *Natural history of Barbados*, 1750, by Griffith Hughes, the island being important at the time as the political centre of the West Indies (J.B. **3**).

The *Journal* deals with more subjects than can possibly justify mention here: botany and the relations between plants and animals; the early discoveries of 'electric fire' (electricity); antiquarianism, mainly archaeology; geography and cartography; astronomy and navigation; and early economics through trade and commerce.

The Journal's reception

After five years as editor and major author of the *Journal Britannique* the name of Maty had become a household word in intellectual circles. It is not always, however, that a journalist is accepted in society, and it is therefore of interest to know who his contacts, at various levels, were, whether literary, political, among the gentry and so on. That his work, as the means which secured him a position at the British Museum, was at least evidence of his acceptance on personal grounds by those whose opinion mattered.

The first considerable reward the *Journal* brought its editor was the friendship of Thomas Birch, DD, FRS (1705–66), the literary historian of the period (Courtney, 1886). Maty would have heard of Birch from the day of his arrival in London. But how long it took Birch to hear of Matthew Maty is uncertain. In 1749, the Dutch publisher of the *Journal Britannique* sent a brochure about it, which came to Birch. Writing to Philip Yorke, he referred to the

> Project d'un nouveau Journal, qui paraitra tous les Mois sous le Titre de *Journal Britannique* par M. Maty, Docteur Philosphie et de Medicine.

Maty's initial approach to Birch seems to have been an invitation to the first of his Thursday teas:

> June 29 1751 Slaughter's
> Dear Sir, Having Mr Jortin's promise to come and drink tea at my house next Thursday, I make bold to beg of you the same favour. Your generous and unmerited kindness to me has been so great that it must create in me the strongest desire of a particular acquaintance with you. I am with no less gratitude than esteem Dear Sir,
> Your most obdt. Humble Servant M Maty. (B.L. Add. MSS. 4313 f. 294)

This tea party was the first of a regular series every Thursday onwards until Birch's death in 1766 (Nichols, 1812–15 **3**: 537). By this time it must have been clear to Maty how much the continued support of Birch and his friends, would mean to furthering the *Journal*, and indeed so significant was Birch's role to become in Maty's life that something must be said of Birch's career and of the society of which he formed the centre.

Thomas Birch became known as one of the leading literary historians of the mid-eighteenth century. He was the son of a Clerkenwell coffee-mill maker, a Quaker, whose urge for knowledge urged him to forsake his father's business for study. Endowed with a great power of work, he supported himself as an usher at the schools he had attended. At the age of about 25, as a tutor to the family of Lord Hardwicke, then Attorney General, he decided to enter the church. Then, in 1732, under his lordship's patronage, he was granted a benefice, *sine cura*, at the Vicarage of Ulting in Essex. That same year his learning secured him a position as one of the three editors of a new edition, with biographies of Englishmen, of Pierre Bayle's great *General dictionary, historical and critical*. By the time of its completion in 1740, he had become virtually its director.

In the meantime, he was responsible for the start of a series of biographies, supported by the works of English worthies, which he continued throughout his life: Milton, Boyle, Tillotson, Queen Elizabeth and many others. To this application for scholarship, he was blessed with a genius for companionship. His friends included a large circle of men of influence in the church, his profession, but equally in science, literature and the arts. As a consequence, from 1752 onwards honours came freely; an MA from the University of Aberdeen, a DD from Lambeth, an appointment as Chaplain to Princess Amelia, George II's daughter, and so on.

In 1752, his accomplishments brought his election as Secretary to the Royal Society, and in 1753 as an Elected Trustee of the group of distinguished men selected to found the British Museum. His main contribution before the Museum opened in 1759, was the establishment of its joint library in Montagu House. Whatever Maty gained from associating with a scholar of Birch's standing, he was also fortunate in himself possessing gifts that brought him into Birch's social circle.

The Society of Gentlemen

Societies of Gentlemen were common enough in England at that time, usually named after the locality where they met. Such societies did not usually include members of any one profession since there were not the numbers to form single subject societies, but they provided the nucleus for the later literary and philosophical societies and so of the learned societies of the next century. The Society of Gentlemen at Edinburgh, for instance, may have been scientifically inclined, since it early made benefactions of natural history specimens to the British Museum.

Although the members of the Thursday's tea club would appear to have given it an ecclesiastical flavour, its predominating interest was literary. The 'regulars' were Birch, Maty and John Jortin, the ecclesiastical historian, as great an attraction as was Birch himself. Others were César de Missy (1703–75) Huguenot minister; Caspar Wetstein FRS (d. 1760), Chaplain to HRH the Dowager Princess of Wales; John Brown (1715–66) preacher and essayist; Robert Young, surgeon; David Ravaud FRS; Ralph Heathcote, DD (1721–95), who edited Jortin's work, and wrote an account of his life. He joined later, as did Samuel Clarke, son of the metaphysician, Dr Samuel Clarke DD (1675–1729).

To tap this fountain-head of literary, historical and ecclesiastical knowledge, others came from time to time, William Markham (1719–1807), Archbishop of York; William Warburton (1689–1779), Bishop of Gloucester; Thomas Hayter (1702–62), Bishop of Norwich and preceptor to George III when Prince of Wales; William Herberden (1710–1801), eminent physician and historical writer; Daniel Wray (1701–83), antiquary and later Trustee of the British Museum; Edward Mason, secretary both to the Duke of Cumberland and Walter Jeffreys.

The records of the meetings of the Thursday's tea club are preserved in Birch's *Diary* (B.L.

Add. MSS. 4478), a document of 425 folios covering the 40 years between *c.* 1716 and 1764. Its value lies in the record, less of what he did than of those he met. Between 1750 and 1760, for example, in 10–20 entries a month, in seldom more than a line or two, written in an abbreviated Latin scrawl (almost a short-hand) and later in English we learn of his official or social contacts: which bishop came to see him; that there was a meeting of the Society for the Propagation of the Gospel; that he dined at the Chaplain's table at St James's with the Archbishop, or attended a meeting of the Trustees of the British Museum. There is occasionally a note of some work completed or started. But most of the entries are lists of names in Latin, of those engaged in the social round, an almost unending kaleidoscope of the meetings of a relatively small circle of friends week after week. There is Thursday's regular *Bibebum Theum*, for tea, with Maty and others, or the *Prandebum*, those with whom he dined.

The latter include Birch's circle of intimate friends: Richard Mead, John Ward, Lord Willoughby, William Herberden, Robert Taylor, William Watson and, of course, the Hardwicke family including Philip Yorke (Lord Royston) son of Lord Hardwicke; but not at dinner, significantly, Matthew Maty. With this exception it may be said that the circle of Birch's acquaintances includes the names of most of those of any distinction that appear in the *Journal Britannique* or who were influential at this time.

Birch's closest friends would appear to have been Richard Mead and John Ward whose obituaries he wrote. Mead has been discussed already. John Ward started as a clerk in the Navy Office, and finding that '. . . to converse with boys upon the subject of literature was better than to transact the ordinary affairs of life among men . . .' (Birch, 1766) he opened, in 1710, a school in Moorfields, being appointed Professor of Rhetoric at Gresham College in 1720. From there, in demand as a literary critic, he achieved renown for his treatise upon rhetoric; for his dissertations on classical writers; his contributions to the Royal Society, and for his work for the Society of Antiquaries to which the President, Lord Willoughby, appointed him Vice-President. Long a friend of Sir Hans Sloane, in 1753, he became an elected Trustee of the British Museum where his antiquarian collections are preserved. He was not, however, a frequenter of Thursday's tea club, nor do his relations with Maty appear to have been at a familiar level.

The Royal Society, 1751

In 1751, encouraged by the reception given the *Journal Britannique* and by Thomas Birch, who was then about to become Secretary of the Royal Society, Maty applied for its Fellowship, being elected in December. Birch's signature was followed by those of two of the most eminent medical men of the day, Richard Mead and John Pringle, the latter already the authority in military medicine and later to become President of the Society. Both were admirers, and Pringle an ex-pupil, of Herman Boerhaave. Maty's other supporters were Martin Folkes (1690–1754), venerable antiquarian, President of the Royal Society and of the Society of Antiquaries, and John van Rixtel (Royal Society Certificates 1751–66 f. 443).

It is worth noting that the certificate, although it mentions mathematics, emphasizes the *Journal Britannique* as designed 'to do justice to the writers of our Country, and containing several original pieces of his own. . . .' Indeed, for Maty, taking his bow in the *Journal*, it is clear he saw it as the reason for his election rather than for any other contribution he may have made.

Advertisement

> Au President et Aux Membres de la Societé Royale de Londres –
> Messieurs. J'ai taché de me rendre utile; vous daignez m'en recompenser. Honoré d'un nouveau tire, je consacre à mes Juges Ouvrage qu'ils ont couronné. Si jusqu'ici le désir de mériter l'approbation des Sages me soutient, des efforts plus vigoureux

> seront les fruits de la reconnaissance et de l'émulation. J'ai l'honneur d'etre, Messieurs, Votre trés humble et trés obeissant Serviteur, M Maty.
> Londres le 4
> Janvier 1752.
> (J.B. **1**)

This was recognition indeed!

Academy of Sciences of Berlin, 1755

On 16 January 1755 there followed Maty's election as a foreign member of the Académie Royale des Sciences et des Belles Lettres de Berlin through the agency of its president, Pierre L. M. de Maupertuis (1698–1759), the French mathematician and astronomer, and its secretary J. H. S. Formey (1711–97), the Prussian philosopher and theologian with both of whom he was in correspondence. Maupertuis had been invited to Berlin by the King of Prussia in 1740, and returning in 1744 was elected President of the Academy in 1746. He had become a Fellow of the Royal Society in 1728 and may have struck up a friendship with Maty during visits to London. Maupertuis's *Essai de philosophie morale*, 1750 had been reviewed in the second volume of the *Journal Britannique*, and Maty's letter of acknowledgement of the Berlin honour is printed in the 1755 volume (J.B. **16**).

In 1759, Maty was made a foreign associate of the Royal Society of Haarlem, and in 1765, when his reputation came to be linked with his work for inoculation, he was elected a foreign member of the Royal Academy of Sciences in Sweden.

William Duncombe, 1754

The respect Maty was accorded in his social life was welcome as the formal acknowledgements of learned societies which, however humbly accepted in the style of the period, a man of Maty's temperament would have considered his due. That his reputation reached the highest in the land is clear from a letter written by William Duncombe (1690–1769) (Wall, 1888) who lived, like Maty, in Frith Street, (Wheatley, 1891), and who for 25 years enjoyed the confidence of Thomas Herring (1693–1757), Archbishop of Canterbury (Hooper, 1891). This is revealed in a volume of the Archbishop's letters edited by Duncombe's son, John (1729–86), some 20 years after his father's death. The following letter is, however, from Duncombe to the Archbishop, dated 16 November 1754:

> I have lately commenced an acquaintance with a fellow of the Royal Society, Dr Maty, a man of learning and genius. He publishes every two months, at the Hague, *une feuille volant* (as the French phrase it) entitled, *Journal Britannique*. He has continued it five years. In his last number there is an ingenious elogium on Dr Mead. The Memoirs were communicated to him by Dr Birch. In his 12th and 13th tomes he has given an account of Mr Lowth's (1710–87) (Hunt, 1893) lectures, *De sacra poesi Hebraeorum* and of Mr Browne's Latin poem.
>
> At the conclusion of his Journal for September and October, 1753, p. 239, where he gives a short account of the three volumes of Mr Jortin's *Ecclesiastical History*, I find the following words:
>
>> Il suffira de copier ce que l'auteur en dit lui-meme dans l'épitre dédictoire pleine de force et de sentiment, qu'il addresse à ce prélat, aussi savant qu'aimable, qui, elevé à la première place et de l'église et de l'état, sont montre ami de tous deux qui sone de la paix, de lettre et de vertu.

> One would imagine the doctor had been personally acquainted with this archbishop by his drawing so true a picture of him. After quoting the passage (which is indeed an excellent one) he concludes thus:
>
> > Le siècle où un ecclesiastique tient ce language et où un archeveque l'autorise à le tenir, ne seroit il pas celui où la lumière doit se repandre, et la chartié unir de nouveau tous les hommes?
>
> The doctor is in easy circumstances, and know nothing of my mentioning his name here. He is born in the province of Utrecht. I am etc. W Duncombe.

Whether Maty remained sufficiently close to William Duncombe in 1756 when the Archbishop, as one of the Principal Trustees of the Museum, was involved in the appointment of the staff, is a matter of conjecture, but Maty had no hesitation about writing personally to Herring to support Henry Rimius's application as his assistant in the Department of Printed Books.

Dr Samuel Johnson, 1755

James Jortin wrote to Lord Hardwicke when Maty applied for a position in the British Museum describing how Maty had managed in the *Journal Britannique* to avoid most of the shoals of controversy (B.L. Add. MSS. 36269, f. 104–6). If Maty, in Gibbon's words, had handled the rod of criticism with the tenderness and reluctance of a parent, (Gibbon, 1827, **1**: 105), Johnson (1709–82) of *Dictionary* fame did not think so. The first of Johnson's works to receive Maty's attention was the monthly periodical *The Rambler* the aim of which was the instruction of the reader in wisdom and piety, and at the same time the refinement of the English language (Harvey, 1942). To this Maty devoted two articles in the *Journal* to which, although *The Rambler* had been coldly received by the public, Johnson took no exception (J.B. **4, 8**) but it may not have been lost on the learned doctor that whereas his majestic and sonorous *Rambler* survived public opinion only two years (1749–51), Maty's *Journal* was still going strong at five.

In his review of *A dictionary of the English language* in the final volume of the *Journal* Maty offended Johnson in no uncertain manner. At the start of his work Johnson had sent Lord Chesterfield a prospectus in the hope, even in the expectancy of patronage. But the meagre £10 Chesterfield sent in reply was not followed up until near the day of publication, seven years later, when anonymous articles, known to be by Chesterfield, appeared in the *World* (a successor to *The Rambler*) eulogizing Johnson and his work. So the *Dictionary* appeared without the expected dedication to Lord Chesterfield, and Johnson's resentment, after so long a struggle, was not to be appeased. The letter of 7 February 1755 his Lordship received contained so noble and dignified a rebuke that it has passed into a classic of English literature (Boswell, 1950).

In his review of the achievement of the *Dictionary*, as fair and perceptive as the verdict of posterity, Maty commented on its author's failure to make clear his position in politics and religion '. . . foiblesse de faire connaitre ses principes de politique et religion' (J.B. **17**). But Maty's greater sin, as unnecessary as inexplicable, was the defence of his patron in an affected innocence, wilfully suppressing Johnson's reasons for his letter (de Morgan, 1857). According to Boswell, in his *Life*, Johnson's anger came to a head when he was looking round for an assistant for a projected magazine (Boswell, 1950). A friend of Johnson's, William Adams (1706–89) (Stephen, 1885), Master of Pembroke College, Oxford, had put Maty's name forward as being recently free of the demands of the *Journal Britannique*. 'He', said Johnson, 'the little black dog! I'd throw him into the Thames'.

Edward Gibbon, 1761

An interesting glimpse of another of those with whom Maty came into touch through the *Journal Britannique* followed in 1758, three years after it had ceased publication. Its quality had left such a mark on the mind of an impressionable young man that when he wanted advice about his own writing he came to Maty as one of the few people in London who could give him what he felt he needed. This was Edward Gibbon (1737–94), then 21, who had just returned from Lausanne with the draft of a partly completed *Essai sur l'étude de la litérature*. His father was encouraging him to complete and publish it; but Gibbon had been told by a learned Jesuit friend, Father Sirmond, that a young writer should reach the mature age of 50 before he gave himself or his writings to the public (Gibbon, 1827, **1**: 105–7). Instead, Gibbon sought that maturity from the experienced editor of the *Journal Britannique* and enjoyed what he described as several free and familiar conversations.

That was written after Gibbon had achieved fame, and mellowed, but in fact the confrontation strained relations, and the *Essai* lay dormant for two years while Gibbon was active with the militia or abroad. In April 1761, his father, becoming concerned for his son's employment, asked Maty to see the *Essai* through the press. To it Maty, unknown to Gibbon, added a Preface which did not please, and which Gibbon described later as:

> . . . an elegant and flattering epistle to the author, which is composed however with so much art, that, in case of defeat, his favourable report might have been ascribed to the indulgence of a friend for the rash attempt of a *young English* gentleman. (Gibbon, 1827, **1**: 107).

Copies of the *Essai*, with Maty's signed preface, went principally to the friends of Gibbon sen. in the hope that it might inspire them to consider his son for preferment, including the Lords Bute, Chesterfield, Egremont, Bath, Lichfield, Hardwicke and his son Philip, Daniel Wray, a Trustee of the Museum and others.

This was not, however, the end of Maty's association with Gibbon who took advantage of his friend's wide circle of French acquaintances to get introductions. One of these was to the Duc de Nivernais, statesman and author (1716–98), who, in 1763, was in London as an emissary of peace. To deprive the present reader of at least one *bon mot* from the hostess of a Parisian *salon* would be a pity when Madame Goeffrin's tongue described the Duke as acknowledged to have parts and wrote at the top of the mediocre, but

> . . . *il est manqué partout; guerrir manqué, ambassadeur manqué, homme d'affairs manqué et auteur manqué – non il n'est pas homme de naissance manqué.* (Lewis, 1926 **1**: 175)

Maty's association with Gibbon before he achieved fame may have given Gibbon more than it gave Maty, but at least it assured Maty a place in Gibbon's Pantheon, the *Autobiography*:

> By descent and education Dr Maty, though born in Holland, might be considered as a Frenchman; but he was fixed in London by the practice of physic, and an office in the British Museum. His reputation '*Journal Britannique*', which he had supported, almost alone, with perseverance and success. This humble though useful labour, which had once been dignified by the genius of Bayle and the learning of Le Clerc, was not disgraced by the taste, the knowledge, and the judgement, of Maty: he exhibits a candid and pleasing view of the state of literature in England during a period of six years (January 1750–December 1755;) and, far different from his angry son, he handles the rod of criticism with the tenderness and reluctance of a parent. The author of the '*Journal Britannique*' sometimes aspires to the character of a poet and philosopher: his style is pure and elegant; and in his virtues, or even in his defects, he may be ranked as one of the last disciples of the school of Fontenelle. (Gibbon, 1827 **1**: 105)

Medical and other matters in the 1760s

Of Maty's practice as a physician so little is known that there is not even a record of his involvement with his friends of the *Medical Club* of the 1740s and in the years which followed. Such evidence as emerges later, generally associates his name with the upper crust of society. In 1762–3, for instance, he appears to have attended the Duc de Nivernais who was in England to negotiate the First Treaty of Paris, ending the Seven Years War (Janssens-Knorsch, 1975: 27). Between 1763 and 1768 three of Lord Chesterfield's letters refer to Maty's successful treatment of his son. In December 1763 Chesterfield, at Bath, was writing to his son in London who had a cold:

> . . . should it be anything more, pray consult Dr Maty, who did you so much good in your last illness, when the great medicinal *Matadores* did you so much harm.

In 1764, 10 November, Chesterfield was at Bath, and his son at Dresden:

> . . . tell him too [physician at Dresden] that, in your last illness in England the physician mistook your case and treated it as gout, till Maty came, who treated it as rheumatism, and cured you.

In 1768, 12 March, Chesterfield was in London and his son at Montpellier:

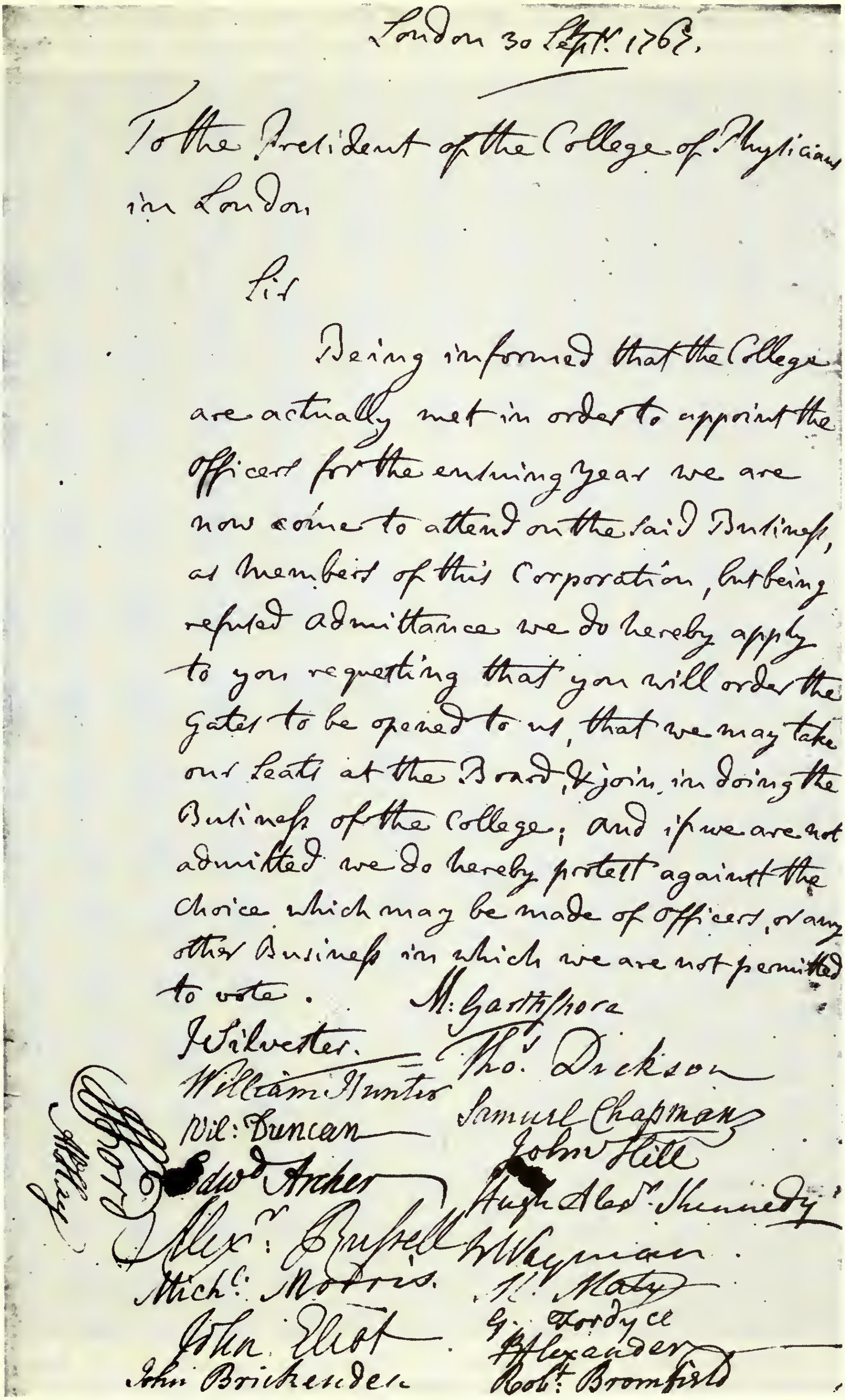
> . . . I am convinced that the Montpellier physicians have mistaken a material part of your case; as indeed all physicians here did, except Dr Maty. (Dobrée, 1932 **6**: 2572, 2631, 2840)

That Maty was successful in practice was implied by William Duncombe in the letter to the Archbishop of Canterbury already quoted. Maty had continued practising by leave of a bishop's licence, allowing him only to practice outside a radius of seven miles from the centre of London. In 1765 the College of Physicians sought to restrain him. In April he received a summons from the College to appear before the Comitiis Censoris Extraordinarius, to be examined in Physiology; followed on 3 May and 7 June for examinations in Pathology and Part Theraputica. On 25 June he appeared with others before the Comitiis Ordinarus Majoribus, and

> . . . being Ballotted for were elected and having given their faith to the College were admitted and subscribed the faith to be given to each Licentiate according to Statute. (College of Physicians, Register Book 1765–1771)

In the course of 70 years (until 1835) many protests, legal and otherwise were made by licentiates of the College of Physicians (those without Oxford and Cambridge degrees), that, as members of the College they should be allowed to take part in the business of the College and in the election, for instance, of its officers. In one of these protests, by letter dated 30 September 1767 to the President of the College, Maty joined with 19 others (Plate 2). Most of these had taken their degrees at Scottish universities, or, like Maty, at Leyden or Rheims. Seven were Fellows of the Royal Society, and four appear in the *Dictionary of national biography*. One signature on this letter of protest is that of William Hunter (1718–83), teacher of his worthy brother, John (Fox, 1919: 146).

In the 1760s, Maty was still participating in a Medical Society (of Physicians) in London which Fothergill had founded in 1750 or 1752 and which met at the Mitre Tavern in Fleet Street on alternate Monday evenings. A quarter of the Society's *Medical observations and enquiries* (Fothergill, 1757–82) were contributed by Fothergill himself, who also financed the whole. Maty contributed two papers only, both in 1769 (Maty, 1769). The Society seems to have lapsed after the deaths of Fothergill in 1780, Daniel Solander in 1782 and William Hunter in 1783.



London 30 Septr. 1767.

To the President of the College of Physicians
in London.

Sir

Being informed that the College are actually met in order to appoint the Officers for the ensuing Year we are now come to attend on the said Busineſs, as Members of this Corporation, but being refused Admittance we do hereby apply to you requesting that you will order the Gates to be opened to us, that we may take our Seats at the Board, & join in doing the Busineſs of the College; and if we are not admitted we do hereby protest against the choice which may be made of Officers, or any other Busineſs in which we are not permitted to vote.

M: Garthshore
J. Silvester.
Thos. Dickson
William Hunter
Samuel Chapman
Wil: Duncan
John Hill
Edwd. Archer
Hugh Alexr. Kennedy
Alexr: Ruſsell
W. Wayman.
Michl. Morris.
M. Maty
G. Fordyce
John Eliot.
Alexander
John Brickenden
Robt. Bromfield

Plate 2 College of Physicians: Letter of protest by 30 Licentiates, signed by Maty and others, September 1767. (Courtesy Royal Society of Medicine)

In 1760, Maty joined the Society of Arts (to which Peter Templeman had just been appointed Secretary), being proposed by Gowin Knight who was active in its affairs. He was soon appointed to several of the Society's committees: Mineral, Correspondence, Manufacturers and Mechanics on which he found his medical friends, Watson, Parsons and Fothergill, and Collinson as well. There were also several other membes of the Society whose work he had reviewed in the *Journal Britannique*, churchmen and travellers and others who would not ordinarily have crossed his path. Other calls on his time, however, received priority and although his subscription is recorded as having been paid in 1763, the 1768 List of Members does not include his name.

In 1765, at the Royal Society, Maty replaced Thomas Birch as joint Secretary, giving up the Foreign Secretaryship, assumed from James Parsons, in 1762. As Secretary he served first with Charles Morton, and from 1773 with Bishop Samuel Horsley (1733–1806), theologian and mathematician. Maty's appointment coincided with the increased activity Lord Macclesfield's tenure of the presidency had placed on the Society, seen in the expanding *Philosophical Transactions*. The duties involved editing and, if necessary, translating papers against which his name appears. However, his own contributions during the 24 years of his fellowship numbered only three (Maty 1752, 1756 and 1767).

Portrait and character

About the year 1753, when the *Journal Britannique* had brought honours to its author, Maty's portrait was painted by Bartholomew Dupan (1712–63), a Swiss artist whose work was fashionable in England at the time (Gordon, 1891). Maty was then 35, but the portrait depicts a rather younger man in a somewhat affected pose (Plate 3). He is leaning on the back of a chair holding a book he had been reading. The light falls on a refined, good looking face suggesting a sensitive, contemplative personality. One may guess it was as he wished posterity to see him because the work was left to the British Museum where it hangs in the Board Room amongst those of other eminent Librarians.

If the volume Maty held was his choice it would have been a copy of his doctoral thesis: *Disertatio . . . de consuetudinis officacia in corpus humanum* (Maty, 1740) which, in an enlarged French version, became *Essai sur l'usage* or custom in society. In the 100 pages of this thesis there is as much to be learned of Maty's character as in his later work in the *Journal Britannique*. The *Essai* suggests the work of a clear sighted young man intent on making his way in the world independently of his cantankerous father. So effusive is the dedication to the father that one suspects it reflects a subconscious expression of sympathy for a man who had given his son his talents but spared him his temperament.

Most of those who encountered Maty as physician, author or librarian recall him as a man of accomplished intellect and of exceptional charm. In the 1760s the impression given by Simon-André Tissot of Lausanne, who discussed inoculation with him, expressed what many others felt:

> . . . cet habile Journaliste; Moraliste sensé, Philosophe judicieux, Médicin éclairé, Genie vaste, Esprit charmant. (Miller, 1957: 206)

By intellect Maty was essentially a humanist, also by self-discipline. In his writing he sets out to capture his readers by persuasion, ingratiating himself and coaxing them; and in Gibbon's phrase '. . . he handles the rod of criticism with the tenderness and reluctance of a parent.' A student mature enough to produce the *Essai sur l'usage* could see that a man of intelligence working through a natural charm could reap much to his advantage:

> Ceux, qui cherchent à obtenir des graces, doivent s'attacher à plaire à ceux, de qui il depend de les leur accorder. (*Essai sur l'usage*, 1741: 49)

The author of Maty's biography in the *Dictionary of national biography* perceived that he

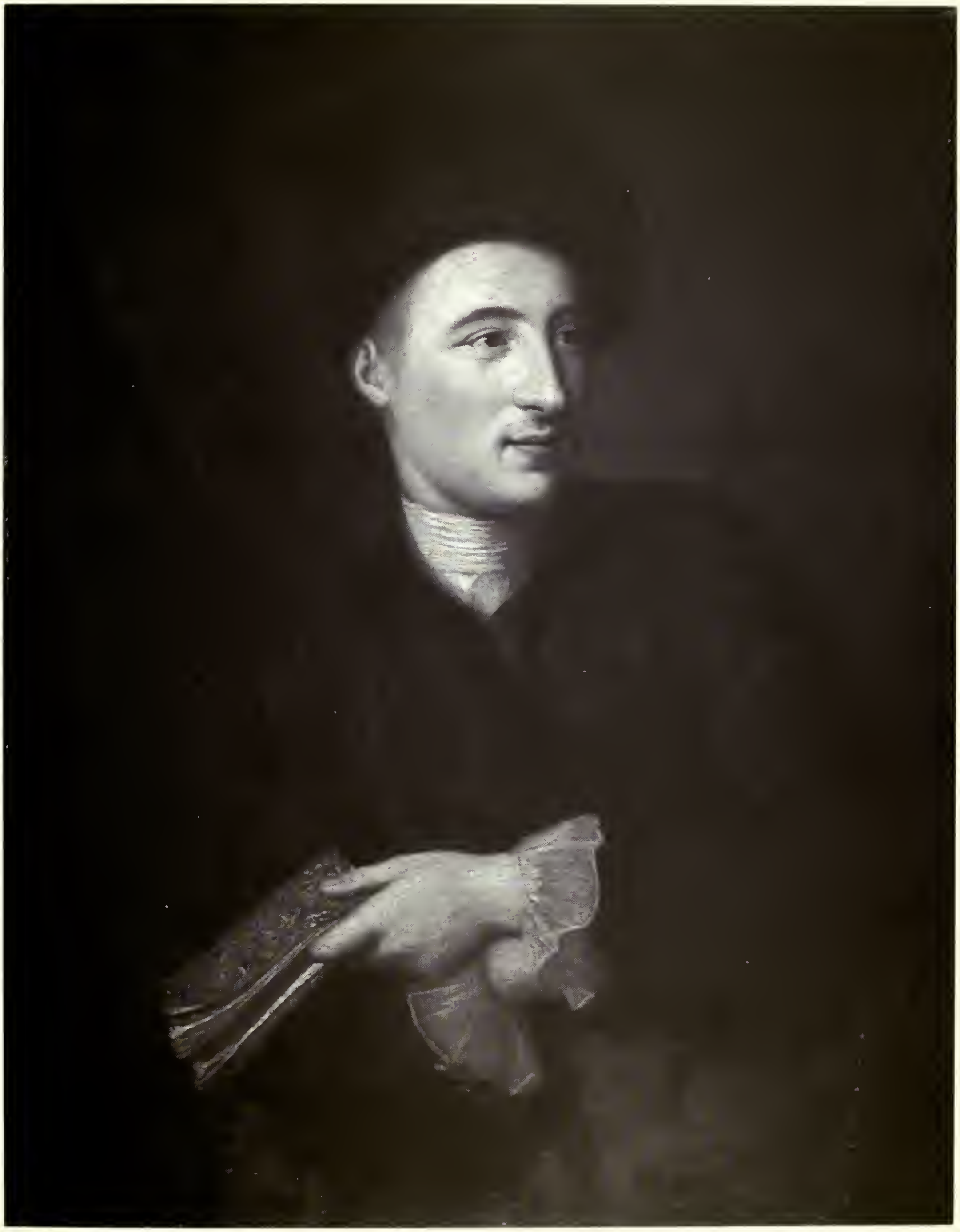


Plate 3 Portrait of Matthew Maty, circa 1753, by Bartholomew Dupan (1713–63). (Courtesy British Museum)

remained on good terms with those who could be of use to him (Seccombe, 1894). One has only to consider who were his principal patrons: Lord Chesterfield for a start; Thomas Birch who brought him under the umbrella of the Hardwicke family; John Jortin who had the ear of the bishops; James Parsons who introduced him to the Royal Society; and William Watson, like him of Huguenot stock, who provided a working link with the Trustees at the British Museum.

It must not be thought that the appearance this versatile Dutchman presented to the world was lawless. On occasion ambition was allowed to get the upper hand. The brush with Dr Johnson was a case in point. There were evidently temperamental differences that made Maty wish to show up the learned doctor as 'refusing' Chesterfield's patronage. When Lord Chesterfield had ceased to be his patron the verses dedicated to his lordship were assigned to Lord Hardwicke; a strange *faux pas* for a man of Maty's experience. In the matter of the Memorial to Birch, Lord Royston sensed Maty's failure to match the expressed intention of writing one. Finally, had Gibbon then been other than an inexperienced young author intent on the publication of his first work, he would scarcely have been willing to allow Maty's gratuitous intrusion in the form of a signed Preface.

A markedly unfavourable opinion comes from an unexpected quarter, from France. In 1764, perhaps following his contact with the Duc de Nivernais, Maty was in Paris and his portrait was painted by the engraver, Louis de Carmontelle (1717–1806) the fashionable artist of the day (Plate 4). In this, Maty is seen seated in a pose, and against a background, he must have approved of. He is dressed in a coat of blue with gilt buttons and black breeches; and he wears a yellow, flower-patterned waistcoat. Above the table at which he is seated stands a glass-fronted cabinet with jars containing a medical man's needs: chemical products and anatomical preparations. Through an open casement one sees a garden of exotic and local plants and trees, suggesting a naturalist's interest.

The portrait is one of many collected into a Catalogue by Richard de Lédans who devotes a page or two to each. Of Maty he has nothing but hard words. Mistaking him for an Englishman, he found in him a supercilious dislike of all things French. 'On aurait de jeter sous le Pont Royal avec une pierre au cou, ce brutal échappé de la Tamise'. (Ms Musée Condé, Chantilly, f. 99)

This is the more surprising knowing how aware Maty was of the cultural influence of French literature and of French society. Maty was almost an exact contemporary of Diderot (1713–1784), the encyclopaedist; in the 1760s the salons of Madame du Defand and Madame Goeffrin were at their zenith. Can it be that Maty's *Journal Britannique* had been ignored in Paris? His call for inoculation had certainly fallen on deaf ears in France. Had the French claim to enlightenment broken down his restraint?

In his early days at the British Museum, Maty was often around the sale rooms on the look out for objects of interest for the collections, and several of the busts he bought he presented to the Museum. He was evidently given to pondering the lives of great men. Of the three Maty retained until his death, one was of Niccolo Machiavelli (1469–1527), not, one may be sure, because politics had any place in his heart, but success through hard work, ability and urbanity evidently had.

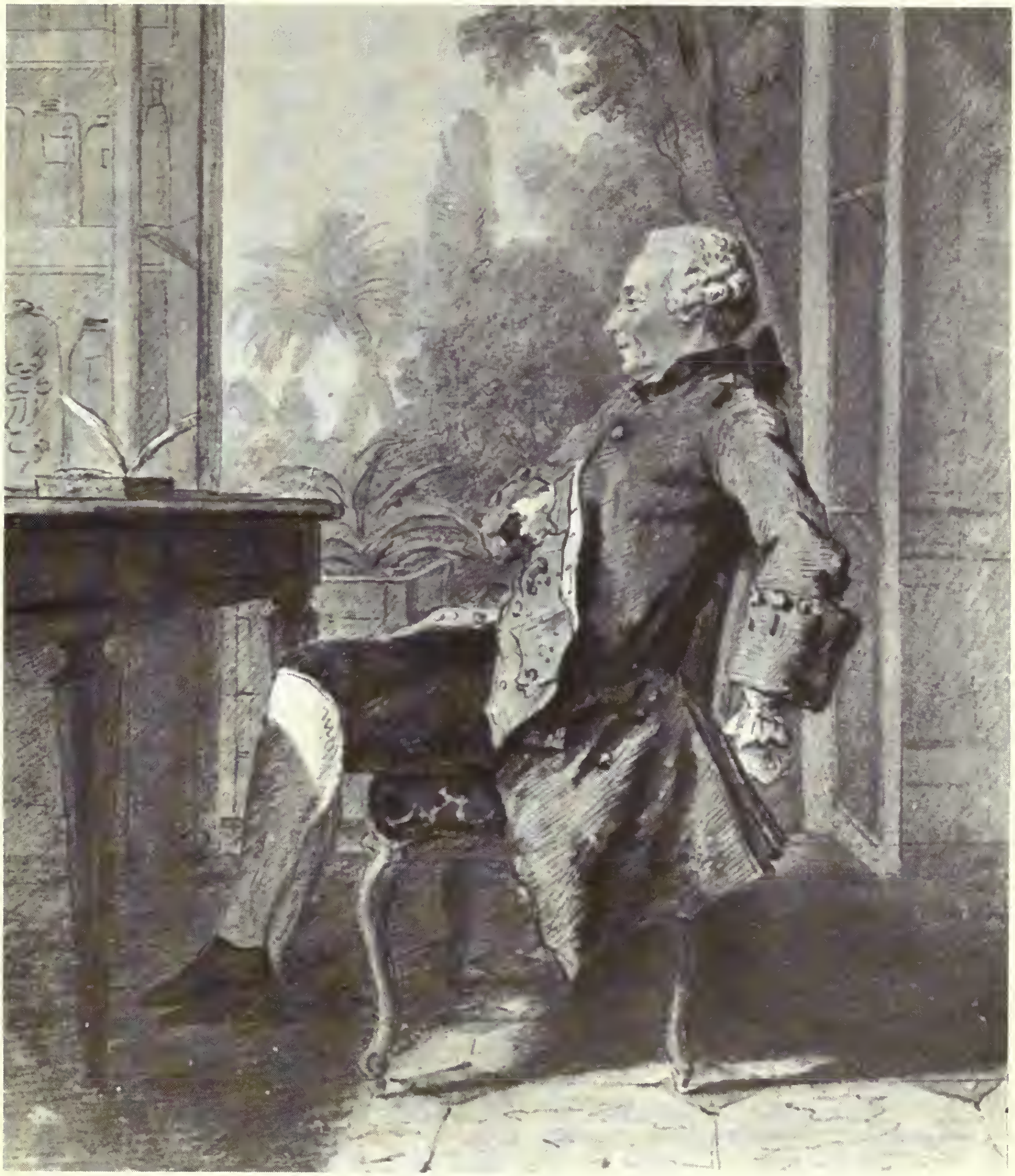


Plate 4 'Le Docteur Maty', circa 1764, by Louis Carrogis de Carmontelle (1717–1806). (Courtesy Musée Condé, Chantilly)

Part III

The British Museum at Montagu House, 1753

When Maty launched the *Journal Britannique* he can have had little idea where such a venture would lead, his aim was to acquire a reputation justifying some public office. But the success which year after year attended the *Journal*, the honours it brought, including the coveted Fellowship of the Royal Society, and the enlargement of his social circle to include a group of eminent men, brought him to raise his sights. Moreover, the evidence suggests that his medical practice was bringing in enough to give him some freedom in what he did.

Early in 1753 Sir Hans Sloane died, and there followed the steps by which, under his will, the British Museum came to be established. The names of those who, in a series of codicils since 1749 had been appointed by Sir Hans as executors, was certainly common knowledge. The majority were men of eminence, public figures or professional men. Of the 56 names in the Codicil of 1751, over 38 were Fellows of the Royal Society. Maty knew most of them personally; but more important were his personal friends close to authority, principally John Jortin, the ecclesiastical scholar, Thomas Birch in literature and William Watson in science.

From 1755 nominations were being considered for staff to take charge of Sir Hans Sloane's collections. A national museum on the scale envisaged would certainly need officials with at least as broad a cultural background as those who supervised the historical libraries and the royal cabinets on the Continent. For this a director with the title of Principal Librarian was to be appointed, assisted by three Under-Librarians for the Departments of Manuscripts, Printed Books,and Natural and Artificial Productions.

Appointment of Librarians

The first appointment made by the Trustees was that in June 1756 of Gowin Knight MD, FRS (1713–72) as Principal Librarian (Prosser, 1893). Knight, the son of a vicar, went to Magdalen College, Oxford, and being a natural philosopher or physicist by inclination devoted himself to the study of magnetism for which he received the Royal Society's Copley Medal in 1747. From 1750 he turned his attention to the mariner's compass, for the improvement of which he received neither the reward nor the credit due from a nation which depended upon safety in navigation for defence and commerce. Like many inventors he was unworldly and lived a secluded life. Against Birch he failed in election as Secretary of the Royal Society. When in the Museum he got into financial difficulties from an unwise speculation in mining, he was rescued by Fothergill with a loan of £1000 which was never repaid. His tenure of the Museum's senior office was not without troubles for the Trustees and his colleagues alike.

There can be little doubt that Maty hoped to be appointed one of the Under-Librarians because in December 1755, in anticipation he brought the *Journal Britannique* to a close and bade his readers farewell. At about this time Maty submitted the following to Lord Hardwicke, the Lord Chancellor:

> The Memorial of Matthew Maty M.D. [Undated; early
> Humbly sheweth 1756 presumed]
> That your Lordship's memorialist being informed that the officers under the Head-keeper to the British Museum are very soon to be appointed, he most humbly begs leave to sollicit the favour of your Lordship's nomination.
> The Memorialist hopes that his character in life, and in the Republik of Letters is such as may not debar him of every claim to the honour he sollicits, and that his diligence and zeal in the discharge of his trust and in the pursuit of learning will in some measure supply the want of greater abilities, no where so completely attained as at this source of knowledge.
> All of which with great respect is most humbly submitted to your Lordship's consideration. (B.L. Add. MSS. 36269, f. 102)

This Memorial was supported by two letters of recommendation, the principal and most persuasive one coming from John Jortin. The other was a postscript in an unknown hand, possibly from Hardwicke's son, Philip Yorke, Lord Royston, an Elected Trustee. Jortin had, it seems, called on Lord Hardwicke, and finding his lordship out, left the following note, an untidy scrawl, presumably at the house:

> [Undated, no address]
>
> My Lord,
> The reason for my waiting on you today was to mention an affair relating to my Friend Dr Maty. He is desirous of offering himself as a candidate for one of the places in Sir Hans Sloane's Museum; not for the highest, he thinks be invidious and impracticable; but for one of the Subalterns. And without any compliment to him I believe that there is not a man in England more fit for it. There should be one person amongst them who is by naturalization an English man by birth a Frenchman [both errors], who by correspondence at Paris, can talk to foreigners in their own tongue. If the Trustees should choose him for one, they would do a favour to him and an honour to themselves. And whom should he apply to but to yourself? I have said nothing of his qualifications of Natural Philosophy, etc. I hope it is no improper request to desire you to recommend him to the ArchBP., and if my name were to be worth a farthing, I should be proud to join it to yours upon such an occasion. I am now going to his house where our [Tea] Club [Society of Gentlemen] assembles tonight, and where every member is, what I am.
> Your Lordships sincerely Humble Servant,
> J Jortin
> (B.L. Add. MSS. 36269, f. 104–6)

It would appear that Jortin saw Lord Hardwicke sometime later and was asked for a more formal statement of Maty's qualifications that could be passed to the Archbishop of Canterbury. The letter Jortin wrote, dated 12 February 1756, tells us more about Maty than we know from other sources and so is quoted in full. The mention of the censure by the *Journal Britannique* of the 'Learned and Loyal Dr Shebbeare' (Norgate, 1897), author of *The Marriage act*, 1754, was a subtle way of attracting the Archbishop's approval of the *Journal*. It had criticized the work of a political writer of idiosyncratic views who would certainly be known to, and disapproved of, by his Grace.

Letter to Lord Hardwicke, as Lord Chancellor, from Dr John Jortin, 12 February 1756:

> My Lord,
> When I had the pleasure of seeing you, you asked me some particulars concerning our friend Dr Maty, of which I will endeavour to give you an exact account.
> He is of Holland, born near Utrecht, of French Protestant parents. His father went to Holland in his youth, and preached there several years in a French church. The Doctor was eight years at the University of Leiden, studied under Boerhaave, and took his degree in Physic there, in the year 1740. Soon after, he came over to settle here, with his father and mother, who now live with him. He is married and hath 3 or 4 children. Besides a knowledge of the learned languages, Latin, Greek and Hebrew, he speaks French and Dutch. English he understands and writes and speaks, as you know, very well. He hath indeed something of an accent (and yet very little) by which you may discern that he is a foreigner.
> He can read Italian, and intends to learn to speak it, which I dare say he will accomplish in a few months. He hath studied Natural Philosophy; and was instructed in Mathematics by a very able master, by his own father.
> He is Fellow of our Royal Society, and Member of the Academy at Berlin, into which he was elected by the recommendation of his friend Monsieur Maupertui; and he

> holds correspondence with several members of the Academy of Paris, and other learned men abroad.
>
> One thing there is upon which he and I have consulted together, and which I would not mention to any except friends, lest possibly it should be made an objection to him. He is not naturalized; but he is determined, if he should succeed in this affair, to get it done, as he is settled here for life, and his wife is an English Gentlewoman, though she speaks French very well. His children, being born here, are naturalized by birth.
>
> In favour of his *Journal Britannique*, I can say very little, because some *Remarks* in it are mine, and because he hath his prejudices, as well as your Lordship and his Grace, and hath thought and spoken too favourably of your humble servant. I can therefore only say that our little society and all my learned Acquaintance have approved and commended that work; and that, as far as I could ever learn, it hath been censured only by two persons, one of whom is the Learned and Loyal Dr Shebbeare, author of the *Marriage Act*, a Novel, and of other Tracts equally useful and respectable.
>
> In short, my Friend, as he hath maintained the character of a sensible, prudent, and civil writer, so hath he escaped extremely well – for an Author – and particularly for a Journalist. This leads me to think a little of my self, and to comfort my self with the consideration that I also have been assaulted by very few, and never by any writer whose censures I have any reason to regard.
>
> Instead of soliciting your Lordships favour and interest on behalf of Dr Maty, I ought rather to take that for granted, and to return you thanks for your goodness to me and to my Friends, many of whom you have honoured so much as to make them yours also.
>
> I am My Lord
> Yr. Lordships most obliged humble Servant
> J Jortin
> Hatton Garden
> February 12 1756.
> (B.L. Add. MSS. 36269, f. 105–6)

The postscript which follows Jortin's letter in the Hardwicke Papers and therefore presumably addressed to Lord Hardwicke, expresses the opinions one would expect of his son, Philip Yorke, or of Thomas Birch, both Elected Trustees:

> [No date, no address]
>
> PS. Our acting Trustees at the Museum are very solicitous to have the Officers appointed as soon as possible. They leave humbly to recommend Dr Maty's Application to your Lordship He is extremely well qualified to be one of the Under-Librarians, as his knowledge of French will make him very useful, in attending upon Foreigners. He is certainly a good scholar and understands Books extremely well, of which he has given the strongest proofs in a very elegant and judicious Literary Journal, the Publication of which he has just dropt.
> (B.L. Add. MSS. 36269, f. 107)

On 19 June 1756, on the strength of such recommendations as these and of the general opinion in which Maty was held, he received the appointment as one of the three Under-Librarians, in his case in charge of Printed Books (B.M. Trustees Minutes, 1756: GM 106). His salary was to be £100 a year, to include unfurnished apartments, free coal and candles. The appointment was secured with a bond of £1500 deposited in the Iron Chest, which is still in use in the Museum. No sooner was he appointed than Maty made the plea, already mentioned, to the Archbishop of Canterbury for the assistance of Heinrich Rimius (d. 1756) (B.M. Trustees Minutes, 1756: GM 121). Rimius, a student of German history, had acquired a unique qualification as historian of the Royal Library, through his *Memoirs of the House of*

Brunswick, 1750 and more recently by his stand against the Herrnhuters (Moravians or *Unitas Fratrum*). At Maty's request Rimius was allotted apartments adjacent to his own in the north part of the east wing of Montagu House; but he died shortly after his appointment. Maty also requested the use of one or two of the garrets in the body of the house in which to deposit his own collection of books, '. . . he promising not to make use of fire or candles in the said garrets at any time' (B.M. Trustees Minutes, 1756: GM 124–6).

Collections and catalogues

By the end of 1756 the various collections and libraries, Sloane's from Chelsea, the Cottonian, Edwards and Harleian Libraries and manuscripts from the Old Dormitory at Westminster, had all found a place in Montagu House. To make sure that none of the natural productions had been left behind:

> Dr Knight visited the Manor House, Chelsea on Wednesday, 22 December last and found everything belonging to the Trust removed to the British Museum. (B.M. Trustees Minutes, 1756: C161, GM 124)

The Under-Librarians then turned their attention, if they had not already started, to the provision of catalogues, to

> . . . the making of new Catalogues or Indexes to old Catalogues of the 'several particulars' contained in the said [three] Departments. (B.M. Trustees Minutes, 1756: C163)

In July 1756, as their first task, Maty and Rimius had been ordered (B.M. Trustees Minutes, 1756: GM 124) to compare the Cottonian and Edwards Libraries with their respective catalogues which were found very ill writ and confused (B.M. Trustees Minutes, 1757: C168) requiring new ones as well as an alphabetical catalogue, Samuel Harper (d. 1803) taking over after Rimius's decease. With the arrival, in October 1757, of the King's Library from the Old Dormitory at Westminster, Maty with Samuel Harper worked out a scheme for its arrangement which was approved by the Trustees in November (B.M. Trustees Minutes, 1757: C379–81, GM 199; B.M. Trustees Reports, 1738–84: **1** (30): 68).

Of the natural history collections it was recorded in the Trustees Minutes by Dr Gowin Knight that:

> The Catalogues are for the most part well writ, but the Contents are in bad order; things of the same kind being frequently dispersed in different volumes; and different parts of the same volume. There is no complete Index; and the vegetable productions belonging to the department are joined with the Hortus siccuses now placed in Dr Maty's [care]; some volumes contain partly medals, and partly natural history.
> Mr Empson thinks it would contribute much to the more easy and speedy classing of the collection, to have the Catalogue transcribed on sheets of paper, with the writing only on one side, which may be done by a common writer and then to clip asunder the articles that are not of the same class, and arrange them properly.
> If this method should be approved, I would recommend it to the consideration of this honourable Committee whether it will not be necessary to employ a writer.
> *Resolved*, that the Catalogue of Sir Hans Sloane's Collection, exclusive of the books and medals, and *hortus siccus* be forthwith transcribed by a person to be provided for that purpose by Dr Knight. (B.M. Trustees Minutes, 1757: C168–71)

Natural Productions and Modern Curiosities

The custody of the collections at Chelsea had been left in the hands of James Empson who, as Sir Hans's constant associate, had been appointed in June 1756 as one of the three Under-

Librarians. From the evidence of a report, *A plan for the general distribution of Sir Hans Sloane's collection*, dated 27 August 1756, (B.M. Trustees Reports, 1738–84 (**1** (16): 39–45) he had been given the task of moving the collections from Chelsea to Montagu House (B.M. Trustees Minutes, 1757: C165). Although given apartments in the East Wing (B.M. Trustees Minutes, 1756: GM 126) it becomes clear that his role was more that of a caretaker than a keeper with professional qualifications. It is not a matter of surprise, therefore, to find the initiative for the arrangement of the natural history collections being taken over by the Principal Librarian himself, Gowin Knight. This left Empson with a number of routine jobs recorded in the Trustees Minutes such as clipping asunder the sheets of the new catalogue, making a list of the books from the Sloane Library that had not been returned. He also helped Andrew Gifford (1700–84), (Cannan, 1890), the numismatist, arrange the Sloane medals, and took care of the insects (B.M. Trustees Minutes, 1757: C306, 1760, C602). It was Knight who, at the General Meeting of Trustees on 14 January 1757, laid down the policy which was to be followed in the overall arrangements at Montagu House (B.M. Trustees Reports, 1738–84: **1** (21): 51–2). Knight's plan (Appendix 4) was passed to the three Under-Librarians for comment who, in November 1757, were called before the Committee and signified their agreement, whereupon it was passed to the General Meeting of Trustees and there formally approved (B.M. Trustees Minutes, 1757: C386, GM 200–8).

Work on the arrangement of the exhibition rooms in Montagu House had already started, and in this Knight and the Under-Librarians had the assistance of several of the Trustees on the Standing Committee. Then, as later, Birch was always ready to give the Under-Librarians a hand with the secretarial work if any of them had to be away. John Ward had made himself responsible for drawing up the first list of antiquities, and William Watson, one of the most active and conscientious of all the Trustees, took over the arrangements of the botanical collections. Already by March 1757, Knight had been empowered by the Trustees to place the fossils in Room K, and then to go on with the vegetables and animals in what space was left (B.M. Trustees Minutes, 1757: GM 208). Sir Hans Sloane's spirit collection was moved from the 'base story' (ground floor) to the 'second state story' (first floor). As the rooms filled up the most valuable of the 'Artificial and Natural Productions' requiring a strong light were placed in mahogany show cases, mounted on castors for movability, under the windows. The Museum was also beginning to receive benefactions and it had to be decided whether they should be shown separately or intermixed with the Sloane specimens to give the effect of completeness. Pressure of space also brought the problem of duplicates to the fore. In these early days, on all such questions, the Standing Committee would seek the sense of the General Meeting of the Trustees before itself passing a resolution (B.M. Trustees Minutes, 1757–8: GM 207, 210, 211, 224, 235).

By the middle of 1758 it was anticipated that the exhibition rooms would be in a condition to allow the Museum to be opened to the public early in 1759. A *Benefactions Book* was designed as a record and as an earnest of gratitude (B.M. Trustees Reports, 1738–84: **1**: 27). A room in the south-west angle of the 'base story' was set aside as a Reading Room, but it later proved too damp. Peter Templeman was appointed Keeper of the Reading Room. The Trustees gave Knight leave to take over a small room on the 'base story' for his personal use and for the display of his philosophical apparatus (magnetical and other improvements). He presented the Museum with the Royal Society's gold medal, the reward for his inventions (B.M. Trustees Minutes, 1758: GM 227, 234–8, 245).

One of the last of the Trustees' acts, requiring, as all staff appointments were, the sanction of the Principal Trustees: the Archbishop of Canterbury, the Speaker of the House of Commons, and of the Lord Chancellor, was the appointment of a 'Waiting Man to serve as Porter with Gown and Staff'. And by a final resolution the Trustees fixed the date of the Museum's opening for 15 January 1759 (B.M. Trustees Minutes, 1758: GM 235).

It was hardly a cause for surprise that from the day the Museum was open, the staff were kept busy. Doubtless buoyed up by the unique opportunities the Museum offered, they enjoyed no sinecure. To their primary task as librarians of arranging and cataloguing books and collections they had to act as guides, secretaries and serve as watchmen in off-hours.

Maty's principal occupation as Keeper of Printed Books was compiling the catalogue of the Royal Library with the help of Samuel Harper. The original report on the project – the sample catalogue page and the rules to guide its compilers – were submitted to the Trustees on 27 April 1759. Six years later, in February 1765, the alphabetical catalogue was ready for copying, and its completion may have contributed to Maty's decision to leave Printed Books for the Department of Natural Productions (B.M. Trustees Reports, 1734–84: **1** (20, 30, 76, 77): 49, 68, 203–10).

The problem of visitors

While the rooms at Montagu House were being fitted out the staff suffered such inconvenience from even the few visitors who were admitted, that the Standing Committee decided that visits must be confined to Saturdays, and up to 3.00 p.m. (B.M. Trustees Minutes, 1758: C451–2). The Museum's *Statutes and Rules*, 1757, 1759, had from the first accepted the principle that, as a national institution, it should be accessible to the public with whatever safeguards proved to be necessary. The degree of accessibility was, however, very much a matter of opinion. John Ward, the elderly professor of rhetoric at Gresham College, represented those who would have severely restricted public access, but wiser counsels prevailed. At first, parties of ten divided between the Under-Librarian and his assistant were conducted through the rooms at hourly intervals, a total of 40 a day on a three hour tour. This started with the Sloane Collection of Curiosities, which is what most visitors came to see, and then, proceeding through the Sloane Library, finished up with the Manuscripts and the Major Edwards Library (B.L. Add. MSS. 6179: f. 19, 61).

After six months of this constant tramp of feet, with the staff unable to get on with the work they were engaged to do, they lodged a formal protest. Maty, acting for the others, submitted to the Trustees a *Scheme for the more convenient showing of the Museum* (B.M. Trustees Minutes, 1759: GM 263–5). This suggested that the number of visitors should be reduced to 15 a day, the tour reduced from three to two hours (cutting down on Manuscripts and Books) which together would halve the officers' attendance time; and because visitors would then be able to see more of what they wanted . . . fewer people will be tempted to see the House two or three times.

After a year's trial Maty's *Scheme*, as it came to be called, was signed by each of the officers (Gowin Knight, Charles Morton, James Empson, Samuel Harper, Andrew Gifford and Andrew Planta); it was approved by the Standing Committee, and after another six months ordered by the General Meeting to be included in the *Statutes and Rules* of June 1761 (B.M. Trustees Minutes, 1761: GM 370); an order confirmed, after another year's trial. It was unfortunate for Maty's reputation that his name came to be associated with a scheme severely restricting visitors, although at that time there were good reasons for it. This was a period of continuous political trouble which included the French Revolution, the Gordon Riots and the Napoleonic wars. During the Gordon Riots the London mob broke open the prisons and burned down private houses including that of Lord Mansfield, the Lord Chief Justice, in Bloomsbury Square, a stone's throw from Montagu House, which, like it, contained irreplaceable treasures. There was no real solution to the admission of the public to Montagu House until the opening of the new British Museum in the 1830s, although Joseph Planta, Principal Librarian, son of Andrew who had also signed the scheme, initiated concessions to students and others from 1800.

Nevertheless, it must also be recorded that two years after his appointment as Principal Librarian, Maty earned a rebuke when he was alleged to have cancelled the 9.00 a.m. tour of the Museum on Wednesdays and Thursdays. He was asked by the Standing Committee whether he could '. . . point out any clause in the Act of Parliament on the Statute which empowered him to dispense with any order of the Trustees?', and he '. . . promised to avoid anything of that kind in future' (B.M. Trustees Minutes, 1774: C1424).

It was not only in larger matters that the Trustees exercised their authority over the Keepers. On a previous occasion Maty had separated a case of Gustav Brander's fossils from his main collection without consulting Brander. The Trustees, not having been approached either, required to know the reason why (B.M. Trustees Minutes, 1768: C1163–5).

Extra-mural activities

It must be abundantly clear that Maty's mind was one of those that needed more than one job to contain it. After a year at Montagu House Maty was already looking round for something to fill his spare time and he considered applying to become editor of the *Bibliothèque des sciences et des beaux arts* which was to be printed in the Hague. In December 1757 he approached Lord Hardwicke, for whom he was doing some research in the Library, for support, and he could hardly have been surprised that his lordship failed to reply (B.L. Add. MSS. 35606: f. 246, 300). Early in 1760 a secretary was needed for the Society for the Encouragement of Arts, Manufacturers and Commerce, founded in 1754 and usually called the Society of Arts. On 1 March 1760, by way of applying, Maty wrote identical letters: one to the Duke of Newcastle recently become Prime Minister and a known master of patronage; and the other to Lord Hardwicke. Both brief, formal letters had identical postscripts:

> PS. Permit me to observe that my employment in the Museum is far from affording a reasonable objection against me. A Library of several hundred volumes of Prints, Drawings, dried plants, etc . . . enable me to furnish useful hints for the business of the Society . . . and the hours of attendance in both places are generally so different that there can be no necessity for my neglecting either. (B.L. Add. MSS. 32903: f. 29)

The letter to Lord Hardwicke, however, contained a second postscript with which was enclosed a copy of verses addressed to . . . Lord Chesterfield's generous interposition in my favour . . . (probably Maty's *Ode sur la Rebellion de 1745 . . .*), to be followed by:

> May I, in the same time, recommend myself in a particular manner, to your L^{d}ps favour by representing that, as on the one hand my salary in the Museum is as little proportionate to the work to be done there, as it is to the education of a pretty large and growing family, so on the other the place I solicit is perhaps the only one, which a foreigner, excluded by birth from all the places of trust and profit might be encouraged to hope for by the Government which in all his writings he strove to defend. (B.L. Add. MSS. 35606: f. 317)

Before it was known that the position had gone to Peter Templeman, then Keeper of the Reading Room, Lord Royston, who had just been appointed to the Standing Committee of Trustees and perhaps feeling the weight of his new office, made his displeasure known. There is no record of Lord Royston's reply, but Maty's suggests what it was:

> 13 March 1760
> My Lord
> As no man has a higher sense of favours than myself, my obligation to your Lordship [Lord Royston] and to my Lord Hardwicke have always met with the warmest returns of gratitude. I have never scrupled to profess that it was to your kind and unmerited interposition that I owed my place in the Museum, and my conduct has, I hoped, proved my earnest desire of fulfilling my duty in all its branches. I am extremely concerned to find your Lordship's sentiments on this occasion so different from mine, and those of several of the Trustees which I applied to on this occasion. Dr Watson, the Speaker of the House of Commons, Mr Burroughs [a Trustee] and one or two more declared that they were satisfied that my pursuit was so far from being improper or likely to become detrimental to the interests of the Museum, that on the contrary it would render the use of the Library more extensive and better

> known. I intended to have consulted your Lordship upon the same subject, but had not the happiness to find you at home, and fondly flattered myself that your Lordship did not disapprove of the steps I had taken. As I now find myself mistaken, how difficult soever it may be to me, in point of honour if not of interest, to disappoint my friends, I think myself obliged out of deference to your Lordship's opinion, to submit it entirely to you – whether I ought to drop all further thoughts of a place, which I could never fill with pleasure, if I thought it was obtained without your approbation. Dr Birch, whom I have intreated to remit this letter into your hands, will after having stated the matter, inform me of your determination, which will immediately influence upon – my operations.
> I am with the highest respect.
> My Lord
> Your Lordship's
> Most obedient and obliged
> Humble Servant
> M. Maty
> (B.L. Add. MSS. 35606: f. 319)

Department of Natural Productions

The year 1765 marked a significant point in Maty's progress. It was half way between his joining the British Museum and his elevation as Principal Librarian. That summer, James Empson, whose health had been failing for two years or more, died, leaving a vacancy in the Department of Natural Productions (B.M. Trustees Minutes, 1765: C947, 997). This would normally have been filled by Samuel Harper, the next in line, who had been assisting Maty with the Catalogue of Printed Books; but since Maty desired to move into Natural Productions, and Harper desired to remain in Printed Books, the Trustees complied with their wishes in the following Minute:

> . . . Mr [Andrew] Planta to succeed Mr Harper as assistant in the Department of Printed Books; and Dr Solander, appointed assistant in the Department of Natural Productions; and Mr Harper and Dr Maty, having likewise expressed their inclinations to exchange their respective departments, so that the former remain the Library, and the latter to be removed to the Department of Natural Productions.
> (B.M. Trustees Minutes, 1765: GM 546)

From the practical point of view this was a logical move and one the Trustees welcomed. Maty was, after all, a doctor and as such had a basic knowledge of natural history such as Samuel Harper lacked. Moreover, when the three Under-Librarians were first appointed, albeit in charge of separate departments within the Museum, their functions were seen rather as those of administrative under-secretaries than as the specialists Keepers have since become. Indeed, the Under-Librarians were encouraged to become familiar with what went on in each other's departments and the transfer from one department to another was therefore considered beneficial.

In the seven years after the opening of the Museum in 1759, the natural history collections had nominally been in charge of James Empson, as Assistant Librarian. As has already been recounted the initiative, and much of the labour, had been assumed by two or three members of the Medical Club of the 1740s, namely: Peter Collinson, merchant and botanist; William Watson, apothecary, surgeon and now a trustee; John Ellis, trader and naturalist, and Matthew Maty busy in Printed Books.

The authority Collinson derived from intimacy with Sir Hans Sloane and as one of the trustees of his will gave him the initiative. It was Collinson who followed up the suggestion discussed with Linnaeus during his visit to England in 1736 that some of those who were familiar with the Linnaean system should come across and help introduce it. In about 1758, Collinson and Ellis together prevailed upon Linnaeus for the loan of one of his pupils to help order the collections in Montagu House. William Watson was himself arranging the botanical collections as they came over from Chelsea. At the time Ellis was less involved and was not asked formally to give assistance until the Earl of Hillsborough's benefaction arrived in 1766, he was already a Fellow of the Royal Society. Also in the background, there was Matthew Maty with an unrivalled range of knowledge, including the most recent advances in natural history, reviewed in the *Journal Britannique*. The extent to which the natural history collections benefited from this galaxy of talent in its early days has so far gone unrecorded.

Daniel Solander and the catalogues

From the day the collections arrived from Chelsea, it must have been clear to the others that Empson was not up to the scientific work of their arrangement. Daniel Solander (1736–82) (Rauschenberg, 1964) with the reputation as Linnaeus' favourite pupil, was due to arrive in England in 1759, but illness delayed him until July 1760. In 1762, when Linnaeus suggested that Solander should apply for the chair of botany at the Academy of Sciences at St Petersburg (now Petrograd), Collinson urged him to remain at the British Museum to catalogue the collections which he already knew well. Accordingly, Solander wrote a formal letter to William Watson stating in detail what needed doing and how long it would take, perhaps two or three years. He estimated that the animals, with many shells and insects, would take about a year to catalogue; the fossils might not take quite so long; but the number of plants would certainly need at least a year to do. The aim would be a catalgoue complete with names, synonyms, locality and use, if any. Since the job would be a full time one for four or five hours a day it could not be done for less than £100 a year. The programme would not interfere with Empson's recording the history of and anecdotes about the specimens told him by Sir Hans; he would merely be relieved of the scientific work.

In February, some days after Solander's letter was written, the Trustees received a letter from Peter Collinson bringing it to their attention that students were being

> . . . deprived of the opportunity of making useful and proper researches into the several branches of Natural History. (B.M. Trustees Reports, 1738–84: **1** (58): 175–8)

This we know from Empson's reply (B.M. Trustees Minutes, 1763: C832–4; GM 444), the tone of which one would expect from a trusted servant who was not up to the work. Much of his time was, of course, consumed in showing parties round, but the collections were immense and he had done what he could in applying the Linnaean system to parts of it and in recording Sir Hans Sloane's observations. He was, however, quite prepared to admit that a 'Person of Superior Abilities' could have done more, and he asked for the Trustees indulgence.

It did not take the Trustees long to make up their minds. On 4 March 1763 the Standing Committee approved Solander's plan, and at a further meeting the draft of a page of a catalogue was approved. Also, since much of the work did not require an officer in attendance Solander would be granted the use of a key, but no work was to be done by candle-light (B.M. Trustees Minutes, 1763: C837, GM 452).

From the start of his contract Solander kept a *Work Book* (hardly a diary) in which he recorded the reports submitted at the Trustees' request. In September 1764 he reported that a 'Systematical Catalogue' had been completed for most of the animals; namely the Insects in the Insect and the Spirit Rooms; the Quadrupeds and some of the Birds and Amphibia; and a start had been made with the Fossils, among all of which were many unlabelled specimens. But what was hindering the work, as he begs leave to tell the Honourable Trustees, was the passage three times a day of parties of visitors through the rooms, and therefore asked if the work on plants, which he is about to start, could be done in the 'base story' because, apart from the specimens, he needed to refer to a number of books at the same time (B.M. Trustees Reports, 1738–84: **1** (67): f. 189). He would, however, continue work on the animals upstairs when the rooms were free of visitors. To this the Trustees consented (B.M. Trustees Minutes, 1764: GM 523). From then on most of Solander's time was given to cataloguing the plant collections in the 'base story' returning upstairs to continue the animals as the rooms were clear.

Solander's progress report of 22 February 1765 (two years after the work had started) should have been signed by himself and Empson jointly, but Empson was too ill to take any further part in affairs (B.M. Trustees Reports, 1738–84: **1** (74, 75) 200–2). A catalogue of some 3000 insects had, however, almost been written out; visitors continued to hinder the work on the Quadrupeds, Amphibia and Birds, but he would work overtime to complete them: the English fossils were described; after the African plants, he would start on the East Indian, as the American and European plants were better listed. However, for the first time one is left with the impression of a lack of accomplishment. By the summer of 1765 the Trustees were impatient for the completion of the catalogues, and informed Solander that he should hire an assistant at his own expense to make a fair copy of what had already been 'writ'. Although one must assume that this was done, the fact that no catalogues of these years have come down to us needs some explanation (B.M. Trustees Minutes, 1765: GM 534, 553; C 985).

The explanation must lie between what Solander, as a systematist accomplished, and what the Trustees as trustees required. The Trustees required an inventory of their collections as a record of their charge. They visualized a tidy row of buckram bound volumes forming an impressive row upon their shelves. To Solander a catalogue was a detailed description of every specimen that passed through his hands but which was flexible enough to accommodate the increase in the collections and of knowledge. For this purpose he devised what he called a *Manuscript slip catalogue*, comprising slips of cartridge paper of a uniform size of 4″ × 6″ (10 × 15 cm) (Marshall, 1978). Slips of groups of animals or plants were gathered loose-leaf as to be expandable. The result of this method is seen in the many thousands of slips in the libraries of the Botanical and Zoological Departments of the British Museum (Natural History). The zoological slips collected in 27 'volumes' number some 5000 and were evidently designed to form a complete catalogue of the animals described (Kay, 1965). This, secured by Joseph Banks and passed to the Museum, remains as the author left it. All this, admirable as the Trustees may have thought it, was not what they wanted and they continued to chafe at the want of formal inventory catalogues.

To all this there was a solitary exception; namely a catalogue of the fossils, mainly mollusca, which the Trustee, Gustav Brander, had collected and presented to the Museum. This appeared in 1766 under Brander's name. As a man of business, accustomed to efficiency, he required the record of his personal generosity (Brander, 1766).

By the spring of 1765 it was evident that Empson was failing. Maty reported in a letter (undated) to Lord Hardwicke that Empson was 'hardly able to get out of his bed' (B.L. Add. MSS. 35607: f. 175). With his death in the summer of 1765 the way was open to Solander's appointment as an Assistant in the Department of Natural History (B.M. Trustees Minutes, 1765: C1010, GM 546), and with that the immediate pressure on him to complete the formal catalogues seems to have lifted. From then onward the *Work Book* shows work to go steadily forward, mainly on plants, with interruptions from time to time, either for Sloane's animals, or for collections coming in. There were those in 1766 from John Greg, the Secretary of HM Commissioners from the West Indian Islands (the gift of Lord Hillsborough (1718–93)) (Russell-Barker, 1893); from Commodore Byron's voyage round the world, from West Florida and elsewhere (B.L. Add. MSS. 45874: f. 9–12). With these, as will be mentioned later, Solander received help from the naturalist, John Ellis (1710–73) (B.M. Trustees Minutes, 1766: GM 548, 1767: GM 600).

On 3 August 1764 the Trustees Minutes record that Joseph Banks of Ormond Street (then aged 21) was given leave to use the Reading Room for six months (B.M. Trustees Minutes, 1764: C956). From this one may conclude that the son of a wealthy father was in contact with the Museum's staff, and probably with the Trustees, from then until his name again appears in the Minutes in June 1768. In the intervening years Banks' interest in Botany took him to Newfoundland and Labrador. In 1768, on learning that the government was sending an expedition to the Pacific to observe the transit of Venus, Banks obtained permission to accompany it and to provide personnel and equipment for scientific purposes at his own expense. The year before, at the first meeting of the Royal Society he attended as a Fellow, he met Daniel Solander for the first time, and a working partnership developed that lasted till Solander's death 15 years later. Banks's request that Solander should join him on the Pacific expedition was seen as a rare advantage to the Museum. Accordingly on 28 June 1768 Solander's request for leave of absence to accompany Joseph Banks on a collecting expedition with Capt. Cook on HMS *Endeavour* was granted by the Trustees (B.M. Trustees Minutes, 1768: GM 622).

The previous February the Trustees had asked Solander to give an estimate of the time it would take him to complete the catalogues of the Natural Productions which had been occupying the previous five years (B.M. Trustees Minutes, 1768: GM 615). The reply is not on record, but a month or so before leaving on the expedition the Trustees were informed that he:

> . . . will leave all manuscripts and papers containing Catalogues and Descriptions of the Natural Curiosities in the Museum in fair and proper order for Dr Maty's use. The Dr [Solander] has advanced so far in the Catalogue that excepting the minerals very few articles remain undescribed. (B.M. Trustees Reports, 1738–84: **1** (88): 225)

Charged with finding a deputy during his absence, Solander recommended 'as no one more suitable', Dr John Obadiah Justamond, FRS (1723–86), the son-in-law of Dr Matthew Maty. A surgeon at Westminster Hospital, Justamond was particularly qualified to work over the anatomical specimens in the Sloane collection that had not then been touched. Justamond's writings on medical and surgical matters, including translations from the French, were further evidence of his competence, which Solander personally vouched for in a formal, and no less fulsome, testimonial to the Principal Trustees (B.M. Trustees Minutes, 1768: C1181, GM 682). With this, Solander's role in the Department of Natural Productions ceased until he returned to the Museum's service in 1773. There is, however, no record of what it was that Solander handed over to Maty in June 1768.

The death of Thomas Birch, 1766

It happened that Maty's transfer to Natural Productions in 1765 coincided with the death of Thomas Birch, an event involving him as an executor for a year and more (Trustees Minutes, 1766: GM 579, 1767: GM 605). In January 1766, returning to Hampstead, Birch was thrown from his horse and died of an apoplexy. He bequeathed to the Museum a vast collection of books and manuscripts, the catalogue of which was not completed until 1771, and also a sum of £500 as a contribution to the stipends of three assistant librarians (B.M. Trustees Minutes, 1772: GM 686). The minute balance from this bequest was still being paid to Keepers at the Natural History Museum in the 1930s.

Birch also left the manuscript of his *Life of John Ward, F.R.S.* (Birch, 1766), one of his intimate friends, which Maty had undertaken to see through the press. In view of Birch's never failing friendship, Maty's friends had anticipated, even urged him, to take the opportunity of adding a memorial to Thomas Birch as a preface to the *Life of John Ward*. But when in May 1766, the *Life* appeared, Maty's memorial took the form of an advertisement of 36 lines (some 160 words).

Writing to Lord Royston in July, it appeared that Maty still had some intention of composing a more adequate memorial, but in fact, never did:

> 26 July 1766 British Museum
> My Lord . . .
>
> As for the letters and other papers more personally regarding Dr Birch, I shall be glad to keep them some time longer, in order to extract those particulars which may serve for the account of his life and writings which his friends and your Lordship in particular seem to expect from me. His diligence, industry and services to the public

> as an Author, his amiable qualities as a man, and his unexceptional character as a member of society and as a Clergyman, it will be my particular care to represent.
>
> But this will be a work of some difficulty, and will require time, especially as I am besides always involved in business of different nature. Your Lordship's assistance I shall humbly crave, and shall hope for the favour of having my sheets inspected before they are published. Nobody can more sincerely both feel and share the great loss we have made than
>
> Your Lordships Most Obedient and much obliged Humble Servant
> M. Maty.

On this letter, Lord Royston penned the comment:

> This account [memorial] has never been given, not much to Dr Maty's credit who had obligations to poor Dr B. [Birch]. (B.L. Add. MSS. 35607, f. 284)

To conclude, for some 15 years Birch had done much for Maty. Apart from the contribution during the years of the *Journal Britannique* made by a man of immense erudition, verbal fluency and literary status, Birch also brought the aura of Hardwicke's patronage to his younger friend in his application for work at the Museum (B.L. Add. MSS. 36269, f. 102). He also paved Maty's way into the Royal Society and helped him to succeed Parsons as Foreign Secretary. However, for Lord Royston to imply dereliction of duty when Birch had acted, among other things, as his friend and literary agent for the previous 25 years, was going a little far. His lordship also claimed to be a writer. Nevertheless, Birch had been the key-stone to Maty's ambitions, and one needs to account for this neglect. Was it, that in his later years Birch did not seem to justify his early reputation? A talented conversationalist, his historical work, so much of it transcribed manuscripts, betrayed an essentially pedestrian mind. Against it one must set Maty's exceptional ability, as one of the great journalists of the period with an analytical grasp and power of expression that were outside Birch's range. The years of Birch's contribution to the *Journal Britannique* may have become overlain by the memory of an ageing man attending Court as a means to fill his time. However, Maty's failure to write an adequate obituary was not only a sin of omission, it showed that he had misjudged the true worth of his friend.

Maty as Keeper of Natural History, 1765–72

Occupied with Dr Birch's affairs, Maty escaped the confrontations between Solander and the Trustees on the lack of catalogues. At issue were more important questions concerning printed books as well as natural history specimens. Paramount was the problem of money. Although the Museum was successful in attracting gifts, there was still much the Keepers would have liked to buy. Fortunately the problems were complementary.

The Museum was embarrassed by a surplus of duplicates, mainly of printed books, which had come with different libraries and occupied badly needed space. Their sale could provide funds for purchase, but an Act of Parliament was needed to free the Trustees to do so. Accordingly, in February 1767, a petition was laid before Parliament which, passed in June:

> . . . enabled the Trustees of the British Museum to exchange, sell or dispose of such parts of the collection . . . as they may decide. (Act 47, Geo. III 1767) (B.M. Trustees Minutes, 1767: GM 599–602)

For the first time, therefore, the Trustees had funds, albeit limited, under their control, which were shortly to be supplemented by those coming from the Major Edwards fund. In 1731, a Major Arthur Edwards of St George Street, Hanover Square bequeathed his library of about 2000 printed books and a sum of £7000 for the preservation and augmentation of the library of Sir John Cotton, which had been given to the nation in 1700 (Edwards, 1870). Owing to a protraction of a life interest in the legacy, the Edwards bequest did not revert to the Museum until 1769, and in February of that year the Trustees were concerned to define the terms for the use of the interest arising from the fund.

Their first resolution on February 1769 restricted the use of the interest to the purchase of items for increasing and enlarging the Cottonian Library, whether of:

> . . . manuscripts, books of antiquities, ancient coins, medals and other curiosities of art or nature books, prints, drawings . . . (B.M. Trustees Minutes, 1769: GM 646)

But there was nothing to suggest, or even to justify the inclusion of natural productions or curiosities. What went on behind the scenes is not revealed, but it is clear that both at the General Meeting and at the Standing Committee, protests were made at the exclusion of anything relating to natural history. In consequence, in September Dr Maty was ordered to:

> . . . report from time to time the Standing Committee what the purchases he thinks may be made in order to supply the deficiencies in the department of Natural History. (B.M. Trustees Minutes, 1769: GM 654)

This was followed by a report in December that:

> . . . the Collection of Natural History is particularly deficient in that part which consists of dried birds and other land animals both from their scantiness and bad preservation . . . (B.M. Trustees Minutes, 1769: GM 656)

Whereupon, at the same meeting the February resolution was supplemented by another authorizing the Trustees to use the proceeds of the Major Edwards Fund for the purchase of:

> . . . such Natural Curiosities . . . as shall be appropriate to the collection of Natural History . . . (B.M. Trustees Minutes, 1769: GM 659)

Accordingly monies from the Edwards Fund joined those from other sources thus:

	£.	s.	d.
Major Edwards Money	476.	13.	2
Duplicates Money (books, coins etc.)	94.	13.	6
Sir William Hamilton Money	93.	9.	10
King's Donation	66.	15.	10

Far from being devoted only to augment the Cottonian bequest of manuscripts and books, the Edwards Fund came to be used for the purchase of natural history specimens (such as the Moll Collection in 1815) and also contributed to the 'extra duties performed' by the Museum's officers. In his evidence to the Select Committee of 1835 (Parliamentary Papers 1835: 1006–24) Sir Henry Ellis was certainly misinformed in saying that the Fund had been used only for manuscripts, books, coins and medals. All this is now merely of academic interest, but the fact remains that for over 45 years a succession of Keepers of natural history relied on the Edwards Fund not only to augment the collections, but for such original work as was done (Edwards, 1870: 443).

It was, however, not only with money matters that Maty concerned himself. As Keeper, he made a positive approach to building up the collections. Without waiting for benefactors, he sought out what others had and to add it to the Museum. Under his initiative the Museum became more than a repository; it became an institution, gaining in importance as it grew.

One of Maty's contacts was the portrait painter, John Greenwood (1727–92) (Greenwood, 1890) who, born in Boston, Mass., had spent five years in Surinam painting and collecting fauna, plants and natural curiosities. He spent the next five years in Amsterdam before coming to settle in London in 1763 where he set up as a dealer in works of art. It was probably through Maty that Greenwood offered his rich and splendid collection of birds and land animals to the Museum for £500, eventually bought for £460, for which, with another specimen or two, Maty paid £480 (B.M. Trustees Minutes, 1770: GM 660, C1251). Greenwood's collection was followed by another, the Leman Collection also of birds and land animals for which the Trustees paid £117, these monies coming from the sale of duplicate books. In March 1770, a selection of 170 dried rare birds from the Kukham Collection in America called for another £70 (B.M. Trustees Minutes, 1770: GM 670). Encouraged by the public's response, Maty took every opportunity of purchasing what he could, either in London or while on leave in Holland, Geneva or elsewhere, and what he paid out of his own pocket the Trustees repaid him out of the Edwards Fund to the tune of £50 (B.M. Trustees Minutes, 1770: C1258–71).

These very substantial additions caused the collections to overflow into the Saloon and Antichamber where visitors usually gathered, so that in future visitors assembled in the Stone Paved Room near the Hall.

In February 1770, some 18 months after Solander had left the manuscript of his cataloguing efforts in Maty's hands, Maty whose interest in the collections was properly aroused, submitted a somewhat impressive memorial to the Trustees (Appendix 5). This contained the suggestion that he should continue the cataloguing where Solander had left off, include what had since been acquired and add 'the Synonims in the chief languages of Europe'. This would take at least a year and could be paid for 'out of a donation of money from his Majesty', such as Solander had received, namely £100 a year. The Trustees' response to this statement of intent was to authorize a minute of 2 June 1770 (B.L. Add. MSS. 35612, f. 215) giving Maty permission to make such a catalogue, for a fee of £100 (B.M. Trustees Minutes, 1770: GM 668, C1245), but as will be recorded subsequently, no such catalogue either in Maty's or in Solander's hand has come down to us. That nothing was done by either appears to be borne out by a note, apparently made for Joseph Banks on Solander's death, which reads as follows:

> June 2 1770. The GM [General Meeting] voted £100 to Dr Maty for making a Catalogue of the Mammalia and Aves in the Museum; but it does not appear that he ever received any part of that sum as he never made any progress in the said Catalogue. (B.M. Trustees Minutes 1770: GM 672)

An explanation could be Maty's loss of health which may have started about this time, and led to his death six years later. That his efforts as a collector gave him some satisfaction is clear from a letter he wrote a year before his death to Lord Hardwicke's son:

> . . . upon the whole I think that part of our Collection the most brilliant as well as the most complete in Europe, excepting perhaps, the Cabinet du Roi at Paris. (B.L. Add. MSS. 31299, f. 1)

The birds had, however, to await the arrival of Solander's successor, Edward Whitaker Gray (1748–1806) in 1782 before they were arranged according to the Linnaean system, and they were not given a catalogue until the 1830s when Gray's great-nephew, George Robert Gray (1808–72) was appointed assistant to his brother, John Edward Gray (1800–75) (Gunther, 1976).

In the eighteenth century, museums were not considered the place for practical zoology and the nearest Maty got to it was the translation of a paper by Professor L. Spallanzani FRS (1729–99), professor of philosophy at Modena, who showed what accurate observation could reveal of the nature of life and growth in the regeneration of severed worms and of the limbs of toads and salamanders (Spallanzani, 1769).

In 1767, Maty, as Secretary of the Royal Society, allowed himself to get involved in a strange incident which although of little importance, is mentioned here because it touches on natural history. The previous year the crew of HMS *Dolphin*, a man of war under the command of the renowned Commodore Byron, reported sighting people of unusual size on the coast of Patagonia. This was attested in a letter from a Mr Charles Clark, an officer on board the ship, who maintained that the natives, seen at close quarters, were nine feet in height being measured by the extension of the arm upwards to the natives' heads (Clarke, 1768). When the report reached the Academie des Sciences in Paris, and was stoutly denied by a French navigator, the Academy wrote to the Secretary of the Royal Society for confirmation. After interviewing the authors of the report and being persuaded of their bona fides, Maty formally confirmed this. However, the denial of other French navigators, agreed in 1767 by the Captain of the Sloop *Swallow*, (Carteret, 1771) lent humour to the story, ridicule being heaped on the unfortunate Secretary of the Royal Society. It inspired the French writer, G. F. Coyer (1707–82) to a lengthy *Lettre au Docteur Maty, Secretaire de la Societé Royale de Londres, sur les Géants Patagons* (Coyer, 1767).

Benefactors and benefactions

Even before Montagu House opened its doors, there was an immediate response for the establishment of a national cabinet of curiosities, rather than merely a national library and archive. This is clear from the actions of one or two collectors. The first gift to be registered came by the Will of William Lethieullier of 23 July 1755 (Edwards, 1870: 347). It was mainly of Egyptian antiquities, but since it included some bottled specimens and a pelican it qualifies for mention here. The first collection of scientific interest followed in 1757, from Gustavus Brander (1720–87), a merchant and antiquary who was a collector of fossils and other curiosities, but sadly none of the specimens has survived. One of Brander's conditions was that he should be appointed a Trustee, an honour accorded him in 1761 when he became one of the most regular attenders with Dr Birch and Mr Watson on the Standing Committee; several later benefactions were also made by him (B.M. Trustees Reports, 1738–84: **1** (24): 56–7).

To accord the benefactors the honour which the Trustees considered their due, a *Benefactions Book* of velum (also called the Velum Book) was designed in 1756 and the names of donors and gifts inscribed in it (B.M. Trustees Minutes, 1758: GM 224). At first these were also recorded in the Trustees Minutes of the General Meeting and of the Standing Committee, but when after September 1770 the proceedings were simplified (B.M. Trustees Minutes, 1770: GM 674), gifts were 'recited from the Benefactions Book' at the General Meetings and formally recorded with resolutions of thanks by the Standing Committee. The first volume of the *Benefactions Book* extends into the 1800s, and with the long series since, is preserved in the Director's office at the British Museum.

Few of the early benefactors could equal the generosity of Lethieullier and Gustavus Brander, but their number and what they gave is evidence of the good will the Museum enjoyed from the first. The more wealthy Trustees, some of them landed gentry with estates and gardens, sent trees and plants for the Montagu House grounds (B.M. Trustees Minutes, 1756: GM 102). Examples were the Rt. Hon. Arthur Onslow, the Speaker; Lord Mansfield, the Lord Chief Justice; the Duke of Argyle; the Earl of Northumberland and the botanists Peter Collinson and William Watson. It was recorded that when Montagu house opened, there were already no less than 600 species of plants in its gardens (Pulteney, 1790, **2**: 305). More interesting was the manner in which the benefactors spanned the social spectrum of the day: the gentry of course, medical men were well to the fore, clergymen, journalists, those in colonial service, from governors downwards, travellers, naval and other seamen, traders, publicans, there was hardly a profession or occupation, that was not represented; and some were wives whose husbands can occasionally be identified.

Over the first 20 years of the Museum's life there were about 250 donors who must have added another thousand or two natural history specimens to the collections and several donors gave on more than one occasion. In the early years the names of the majority of donors appear in the *Dictionary of National Biography* and many were Fellows of the Royal Society or of the Society of Antiquaries. About four fifths of such donors can thus be easily identified, but fewer in the later years when the Museum attracted less distinguished donors. At first there were more gifts in the broad class of 'antiquities' than of natural history specimens, but the latter increased as time went on.

The senior staff of the Museum, such as the Under-Librarians and their assistants, were also among the early donors, Matthew maty foremost among them. He evidently did the round of the London salerooms picking up antiques, objects of art, books, busts and portraits, and some natural history specimens. On his trips to Holland and elsewhere he generally came back with something for the collections. Between 1758 and 1776 the *Benefactions Book* records him making gifts on no fewer than 20 different occasions; the entry of 14 November 1760 lists some 38 books, including several of his own works, which are still in use in the British Library today. On 28 May 1762 the *Benefactions Book* lists 17 busts and portraits given by him.

Most of Maty's medical and naturalist friends and acquaintances also emerge as donors, the more eminent being John Fothergill, William and John Hunter, Thomas Percival, John Pringle, Alexander Russell, William Watson and Thomas Hollis, the literary editor of Lincoln's Inn.

Among the well-known naturalists who made gifts were George Edwards, FRS (1694–1773), ornithologist and friend of Sir Hans Sloane, the donor of the famous painting of the Dodo (B.M. Trustees Minutes, 1759: GM 278) and John Ellis, FRS (1710–76), who gave a copy of his *Natural history of the coralines* with the original specimens and drawings (B.M. Trustees Minutes, 1758: GM 238). Ellis was, incidentally, the first outsider to assist with the displays, being invited by Solander to help arrange a sizeable collection of animals made by John Greg, Secretary of HM Commission in the West Indian islands, which had been presented in 1766 by Lord Hillsborough (B.M. Trustees Minutes, 1766: GM 548, 1767: GM 600). Mention must certainly be made of the gift in 1766 by Mr Browne of Sarum of a 21-foot crocodile from the River Indus which formed John Edward Gray's first memory of Montagu House at the age of four, when it stood across the door of the back staircase, one of the few specimens to survive into the 1800s (B.M. Trustees Minutes, 1766: GM 574).

The department of a museum bearing the title 'Modern Curiosities' was bound to attract anatomical freaks and oddities of preservation, 'monsters' such as: pigs with two heads and six legs, one of which was dissected by William Hunter (B.M. Trustees Minutes, 1770: GM 671, 1774: C1460), a lamb-skin and tortoise, each with two heads (B.M. Trustees Minutes, 1774: C1399, 1437), a lizard with two tails (B.M. Trustees Minutes, 1768: GM 631), the remains of a human heart on a *patera* (dish of wood) found in a hole cut in a column of a church in Cambridgeshire (B.M. Trustees Minutes, 1759: GM 273), the body of a man preserved as a mummy from Tenerife (B.M. Trustees Minutes, 1773: C1408) and so on.

Fossils were still apt to be looked upon as 'curiosities', while 'monstrous bones', were evidence of a past creation. The shapes of stones, particularly of flints if resembling objects such as pear, say, or a petrified loaf, were also seen as worthy of the Museum. Since the Department of Natural Productions cared for the collections of Antiquities, Coins and Medals, the list of benefactors includes the names of several of the better known antiquaries, such as the Revd Dr William Stukeley, Dr Martin Folkes and others who stood on what was then the boundary of natural history.

Ten years after the museum opened, a change is detectable in the nature of the benefactions. While gradually increasing, there was a shift in their origin, more coming from overseas; and what was coming in was more important. The aim of collectors became more purposeful and systematic, but not yet generally more scientific. Gifts came through the agency of wealthy landowners like Lord Hillsborough (1718–93) and the Marquis of Rockingham (1730–82), who diverted collections made on their behalf overseas to the Museum (B.L. Add. MSS. 45875). But the real stimulus to the collections came from the voyages of discovery which heralded Britain's maritime supremacy and the concept of Empire. Public demand brought the Admiralty formally to charge Capt. Cook's second expedition (1772–75) with persuing scientific exploration, with the result that in 1780 the *Benefactions Book* contains the names of Capt. James Cook, and his officers and gunners on board the *Resolution* and *Discovery*. The Forsters, father and son, the officially appointed naturalists to the expedition, brought specimens also.

There are however, two benefactors who symbolize the first decade or so of this period extending into the early 1800s; the first and foremost is Sir William Hamilton, FRS (1730–1803) (Wroth, 1890); and the second, to become one of the greatest of the Museum's benefactors, the then Mr Joseph Banks, FRS (1743–1820) (Jackson, 1885).

In 1764, when Sir William Hamilton was appointed British envoy to the court of Naples, he may well have visited Montagu House and met Matthew Maty there. In 1768, Maty's son, Paul Henry, on a travelling scholarship from Cambridge, stayed with Hamilton in Rome and Naples (B.L. Add. MSS. 40714: 47; 42069: 80). Before Sir William's marriage to an heiress in 1782, the extent of his means was dependent on his own exertions, and these took the not unprofitable form of collecting antiquities and natural productions (rocks, lavas, marine specimens etc.) from the area of the Bay of Naples; from 1768 onwards he was sending chests of them back to the British Museum, where Maty was pressing the Trustees for show cases (B.M. Trustees Minutes, 1768: GM 619, 1770: GM 674). In 1772, Sir William accepted from the Museum the princely sum of £8401 for an outstanding collection of antiquities which formed the nucleus of the Hamilton Collection, later to be displayed as a whole (B.M. Trustees Minutes, 1772: GM 689–90). Sir William remained envoy for 36 years, until 1800, when the Kingdom of Naples was overwhelmed by the spread of revolution and by the Napoleonic wars. In this period, however, apart from collecting, he produced treatises on volcanoes and earthquakes which are among the scientific and artistic treasures of the period (B.M. Trustees Minutes, 1776: C1532).

Although Sir Joseph Banks' connection with the Museum is generally associated with the legacy of his botanical collections in 1820 (and therefore, with a later generation) his first gift was manuscripts in Icelandic donated in December 1773, followed by some birds in January 1775 (B.L. Add. MSS. 45875). His first major gifts of 'curiosities' from the South Seas appears to date from October 1778, to be followed by a long succession which, in 1780, inspired the Trustees to refer to his '. . . repeated liberality to the Museum' (B.M. Trustees Minutes, 1780: C1744). On 30 November 1778 his election as President of the Royal Society made him *ipso facto* a Trustee, and as such he attended his first meeting of the Standing Committee (rather than of the General Committee) on 18 December.

The largest benefaction to come to the British Museum in this period was from the Royal Society which, in 1781, was about to move from its quarters in Crane Court, off Fleet Street, into the then new Somerset House. Although this was five years after Maty's death, it is difficult to believe that in his dual role as Secretary of the Society and Principal Librarian, he would not have been concerned to some extent with the decisions involved.

The Royal Society's collection was based on a 'Repository of Rarities' purchased in 1666, its composition in 1681 being described in Nehemiah Grew's *Museum Regalis Societatis*. As the collection grew, this catalogue was supplemented by manuscript lists made between 1696 and 1779 (Royal Soc. MSS. 413–19), but how many of the hundreds of natural history specimens remained in a condition to be exhibited at Montagu House in 1781, when the removal took place, or how many survived the century, is not on record (B.M. Trustees Minutes, 1781: C1761–6). There had already been a comment on the Society's museum by a German traveller, Uffenbach, that while he could 'mention the Royal Society with honour, their Museum was a great disgrace' (Costa, 1812). The Society's final list closed on 3 June 1779, and contains the names of several donors who had also given specimens to the British Museum, the indefatigable Peter Collinson being among them.

Principal Librarian, 1772

Following the death of Dr Gowin Knight in June 1772, Maty's promotion as Principal Librarian could almost be taken for granted. Dr John Jortin's phrase of 16 years earlier was still true, that there was '. . . not a man in England more fit for it.' (B.L. Add. MSS. 36269: f. 104–6). In his 15 years at Montagu House, Maty had been involved as much in its affairs as any member of its staff, and certainly as much as any of the Trustees. He had been Keeper of two departments, supervised a catalogue of printed books, and initiated the growth of the natural history collections. Moreover, his writing had shown him to be possessed of a universal mind. His one competitor within the Museum was Dr Charles Morton, who had neither Maty's many-sidedness nor record of achievement, and it was little short of tragedy for the British Museum in the last quarter of the century that Maty's tenure of office was so short, and Morton's, as his successor, so long.

The appointment was made by the King under the British Museum Act on the recommendation of the Principal Trustees. Since the text of His Majesty's Sign Manual had been included in the Trustees Minutes on Dr Knight's accession, it was in keeping with Maty's character and his nationality, to have it repeated (Appendix 6). This was not done on any subsequent occasion (B.M. Trustees Minutes, 1772: GM 1347, C1346–8). The formalities fo Maty's appointment were completed at a General Meeting of the Trustees on 24 September 1772:

> Dr Maty, having been appointed Principal Librarian of the Museum by his Majesty; and also Expenditor by the principal electing Trustees; in the room of Dr Knight, lately deceased, has produced his respective appointments before the Committee; and has signed Bonds for the due Execution of each Office in the Penal Sum of £2000 and £1000 respectively, and said Bonds have been deposited in the Iron Chest . . . (B.M. Trustees Minutes, 1772: GM 693).

Once appointed to the Museum in 1756, the question of Maty's nationality appears not officially to have been raised. There were good reasons for allowing the matter to rest. There was at the time much anti-foreign feeling in the country, and there was no point in drawing public attention to a foreigner at the British Museum. On the occasions he visited the Continent he passed for an Englishman. Finally, the cost to the individual of being naturalized was high.

The four years of Maty's incumbency were not marked by any particularly noteworthy event or change in administrative direction as might have been expected of so versatile a man. His biographers attribute the lack of verve to a failing health; in the administrator of the 1770s there is certainly not the vivacity that inspired the journalist of the *Journal Britannique* in the 1750s. The Principal Librarian was also subject to the inhibitions of high office, being seen as a servant of the Trustees rather than as a director.

As Principal Librarian Maty had the satisfaction of seeing the initiatives he had taken during the years of his Keepership bear fruit. The most important was the diversion of the Edwards Fund into the purchase of specimens of natural history, which set the precedent for acquiring outside collections. Maty's ties with the Royal Society made it certain that its duplicates came to the Museum, for example those from the Hudson's Bay Company and the Falkland Islands (B.M. Trustees Minutes, 1772: C1320). Gustav Brander also suggested an exchange of some Royal Society duplicates of natural curiosities for 24 specimens from the Museum's collection (B.M. Trustees Minutes, 1772: GM 716, C1401).

These years, appropriately, coincided with an event as important in the history of the nation as in that of the Museum, namely the first of Capt. Cook's voyages (with Joseph Banks, on the *Endeavour*) which set out with the aim of scientific exploration. The trophies of this first expedition were Banks' property and did not come to the Museum until some years later, but those of Capt. Cook's second expedition in *Resolution* and *Adventure* (1772–75), which Banks had declined to join, were presented to the Museum by the Admiralty on condition that a room was set aside for them. They comprised a large collection of 'natural and artificial curiosities', including arms, costumes and domestic utensils, for which, since there was no space in the rooms given to natural history, Maty suggested the adaptation of the room containing the Sloane MSS. at a cost of £122.11.8 (B.M. Trustees Minutes, 1775; GM 740, 754). It is appropriate to Maty's memory that this first large benefaction that the Museum received in the dawn of the era of great voyages of discovery, was the last he was to arrange. He died the following summer, and it was left to Solander to form the famous Otaheite Room of South Sea Curiosities.

Maty also sought a solution to the growing problem, that while the Trustees were allocating funds to buy new specimens, those in the Museum were being allowed to deteriorate from lack of a 'proper person' to look after them. He referred to those from the Falkland Islands and the Hudson's Bay recently acquired from the Royal Society and 'put into a state of preservation, 4d for a beast and 2d for a bird' (B.M. Trustees Minutes, 1772: C1362). The preservation of stuffed animals and the care of the Museum's collections remained an unsolved problem for at least another half century, so that by the 1800s few remained of Sloane's original specimens, and as likely as not few of what Maty had added.

Maty also brought forward complaints of the dampness of the Reading Room in the 'base story' (ground floor) (B.M. Trustees Minutes, 1774: GM 710). The Keeper, the Revd Richard Penneck, FRS registered his protest as his predecessor had done 15 years before, by absenting himself without leave on the grounds of health. In February 1774, when he was brought to account for dereliction of duty, a General Meeting of the Trustees agreed to an alternative location, and by October a part of the Royal Library (the 'south-west angle room upon the first State Story') was adapted at a cost of £112.4.6 (B.M. Trustees Minutes, 1774: GM 715). Dr Penneck survived to hold court there until his death in 1803.

To add to the amenities of Montagu House, Maty sought leave of the Trustees to enclose a small corner of the garden for his private use, and to remove a large dung hill which offended himself and his wife, at a cost of 16 guineas (B.M. Trustees Minutes, 1772: GM 694, C1357). He also asked for an alteration to the wine and coal cellars; to cut down a tree, 'a great nuisance to his apartments' and to cure dry rot, a periodical recurrence in Montagu House, which had 'seized upon the floor of his parlour' (B.M. Trustees Minutes, 1773: C1383, 1775: GM 743, 1776: C1507).

The return of Daniel Solander

In 1771, on his return with Banks from Capt. Cook's *Endeavour* voyage, the Trustees gave Solander two years further leave of absence to work with Banks on the botanical collections obtained during the voyage. Back in the Museum in March 1773, Solander took Maty's place as Keeper of the Department of Natural Productions. His return, with a reputation vastly increased by five years absence, may have inspired the Trustees to a homily directed at Solander as well as at his former deputy, John Justamond, then appointed his Assistant. The formal opening of the Iron Chest in their presence for the deposit of their Bonds was taken as a reminder that:

> Upon this occasion they were informed that the Trustees expected from them their constant Attendance upon their Duty in their Own Persons and not by any Deputy. (B.M. Trustees Minutes, 1773: C1371)

Although few members of the committee could have been aware of it at the time, neither of these appointments were more important to the Museum than another, namely that of Joseph Planta (1744–1827), then aged 29, in place of his father, Andrew, recently deceased (Wroth, 1896). As Principal Librarian 26 years later, Joseph Planta was to make up for the neglect of a generation by weaning the British Museum out of its eighteenth century habits.

In the nine years of Solander's keepership, 1773–82, he was as occupied outside the department as in it. He continued to live with Banks in Soho Square, helping him with the botanical collections. The prestige travel conferred, together with his social gifts, made calls on his energies. In 1780 he was appointed deputy to the Principal Librarian, Charles Morton, compelled by gout to long absences outside London (B.M. Trustees Minutes, 1778: GM 790, C1625).

The state of the collections after over 20 years of display was a growing source of anxiety, since many of the specimens, especially the stuffed animals, were in a state of decay, and the shells and insects were faded from exposure to light (B.M. Trustees Minutes, 1778: C1634). There were several requests to the Trustees for money for proper boxes, drawers, spirit bottles and other means of preservation.

The arrangement of the Otaheite or South Seas Room must have occupied some time. In it were brought together the several collections made during the course of Capt. Cook's voyages. In this arrangement, from 1780, Solander had the help of William Peckover, the Gunner on the third voyage, who was able to contribute unique local knowledge. Opened to the public in August 1781, the Otaheite Room remained one of the Museum's most popular attractions for the next 30 years.

With the catalogues of collections however, there is no evidence that progress was made. In the 18 months from January 1778 to June 1779, Solander was occupied with the collections of the Duchess of Portland (1714–85), the leading patroness of natural science in the eighteenth century; but again, no catalogue was produced. It was this continued inability to bring his work to a conclusion that has given Solander the reputation of '. . . the most promising yet the most disappointing of the pupils of Linnaeus' (Dance, 1966: 106).

Solander's official diary is a strange, even revealing document (B.L. Add. MSS. 45875). Others used their diaries to record the progress of their work; Solander's served almost exclusively to record the benefactions. If there were none over the fortnightly period, the entry read: 'Nothing new', and this was repeated and signed 150 times. It was as if the writer found nothing of significance to interest him, like Louis XVI of France, whose entry in his diary for March 14 1789, when rebellion was breaking out throughout the country, was 'Mardi 14: rien.' It recorded his Majesty's lack of success at the hunt.

The question of catalogues was next given serious attention some 25 years later. Then, under the Principal Librarian, Joseph Planta, the Trustees appointed a Sub-Committee to review the establishment and duties of the officers. In 1807 it was reported that:

> Departments of the Museum
>
> 4. In the Department of Natural History all the Catalogues are represented to be so defective, that the under-Librarian here will have a choice of labour in which he must be directed (under the sanction of the Trustees and of the Princicpal Librarian) by the joint consideration of his own peculiar qualifications, and the urgency of the particular work. (B.M. Trustees Minutes, 1807: GFM 1011)

This was not a deficiency that could be made good in a day. It awaited the arrival in 1824 of the man capable not only of establishing the tradition of the British Museum catalogue, but also with the ability to match the need, namely John Edward Gray (1800–75).

Of Solander's Assistant, J. O. Justamond, there is little to record. The testimonial Solander had given him in 1768 was hardly merited. Less than a year after his father-in-law's death Justamond became involved in debt and petitioned the Trustees for six months' leave, presumably to escape his creditors, abroad (B.M. Trustees minutes, 1777: C. 1591). Although Maty's son, Paul Henry (1745–87), appointed as Solander's Assistant, appealed in his favour in the strongest terms, Justamond's place was declared vacant (B.M. Trustees Minutes, 1778: GM 782).

Club of Honest Whigs

Maty's social activities during his years as Principal Librarian must, in his then state of health, have been limited by the duties imposed by the Museum and at the Royal Society. If he made any exception, it would have been to join his friends of the Old Medical Club of 1741. This seems to have enjoyed a long life since it reappears in the 1750s and prospered until Maty's death. It, or its successor (since these coffee-house groups had a constantly changing membership), is mentioned in 1757 in connection with the first visit of Benjamin Franklin to London. Franklin's friendship with Maty developed first with Collinson and later with Fothergill over electrical experiments, was cemented in the years Franklin spent in England as a plenipotentiary for the State of Pennsylvania (Brett-James, 1925: 79–118). In these negotiations Franklin had Fothergill's unstinting help and the support of those he met, at what he called the 'Club of Honest Whigs' at the St Paul's Churchyard (later at the London Coffee-House on Ludgate Hill) on alternate Thursday evenings. The old Medical Club , open to a wide range of interests, brought in men such as Dr Richard Price (1723–91), the Unitarian Minister in London, Dr Joseph Priestly (1733–1804), theologian and man of science, Dr John Hawkesworth (1715–73), author and journalist, Dr Andrew Kippis (1725–95), non-conformist divine, John Stanley (1713–86), composer, John Lee (d. 1840), wood engraver, and others (Fox, 1919:317).

Although Maty's views on the worsening relations between the colonists and Parliament are not known to us, like the Quaker Fothergill he was a man of peace, and must have been deeply grieved at the British government's attitude to the turn of events in North America. He would have remembered the atmosphere of tolerance and fairness that had attracted him to England 30 years before. Since he died just a month after the Declaration of Independence on 4 July 1776, he was spared the anxiety of a senseless and fruitless war.

Death and post-mortem

In the last year or two of his life, ill-health must have inflicted trials on a man of Maty's active mind. In such leisure as there was from concern with committees of Trustees and the routine of office, he returned to the fascination of rare books by attending sales. It had been suggested in 1775 that the Museum should offer £5000 for Dr Anthony Askew's complete library, but Maty's outlay was only £302.6 (B.M. Trustees Minutes, 1775: GM 729). A year later at Mr Stanley's sale, Maty spent £21.14 (B.M. Trustees Minutes, 1776: C1503). In October he was empowered to arrange the purchase from the Dresden Library of duplicates in a collection of Byzantine works and other classics (B.M. Trustees Minutes, 1775: C1493). In March 1766 his purchases of books from the Cesar de Missy sale amounted to £70.18 (B.M. Trustees Minutes, 1776: C 1508).

In the evening of his life he found solace in completing a memoir to the *Miscellaneous works* of his patron, Lord Chesterfield, which was left to his son-in-law, John Justamond, to see through the press (Maty, 1777). It is on this work rather than by any of his other activities that Maty's reputation, outside the British Museum, generally rests.

> In the first of these classes [i.e. historical] Doctor Maty holds a position from which it is impossible to dislodge him – that of being the primary source from which all subsequent biographies of Lord Chesterfield have been, and always will be, compelled to draw much of their information (Craig, 1907: 354).

Matthew Maty is believed to have died in his apartments at the British Museum, and it is not known where he was buried. A memorial service was held in the Oxendon Chapel near the Haymarket, off Conduit Street, and a sermon was preached on Sunday, 11 August 1776, by Maty's nephew, the Revd Charles Peter Layard, AM, FRS (1749–1803), Dean of Bristol and a Fellow of St John's College, Cambridge, grandfather of Austen Henry Layard (1817–94), the excavator of Nineveh. The Revd Layard's address was couched in the social verbiage of the time and adds little to our knowledge or appreciation of its subject's talents, achievements and character (Layard, 1776). By his will Maty added to the many benefactions he had made to the Museum in the 20 years of his service: the portrait of himself as a young man and also four busts he had retained from the many he had given, namely those of Petrarch, Boccaccio, Machiavelli and Dante (B.M. Trustees Minutes, 1776: GM 755).

It was a loss to the Museum, as well as a personal tragedy for himself, that Maty's years as Principal Librarian should have coincided with the grip of the illness that brought his death on 2 August 1776, although its symptoms had been present, he averred, for some eight years. A portrait by F. Bartolozzi, engraved in 1776, shows a rather frail Maty (Plate 5). It was typical of him that since he could not himself know the cause of his death, a post-mortem by two of his surgeon friends should, 24 hours after it, show what it was, and that the cause should provide a paper for the Royal Society's *Philosophical Transactions* (Hunter & Watson, 1777). For several years Maty had been inconvenienced by some 20 purging stools every 24 hours, and suspected that the trouble lay in a diseased colon contracted in the kidney region. There was

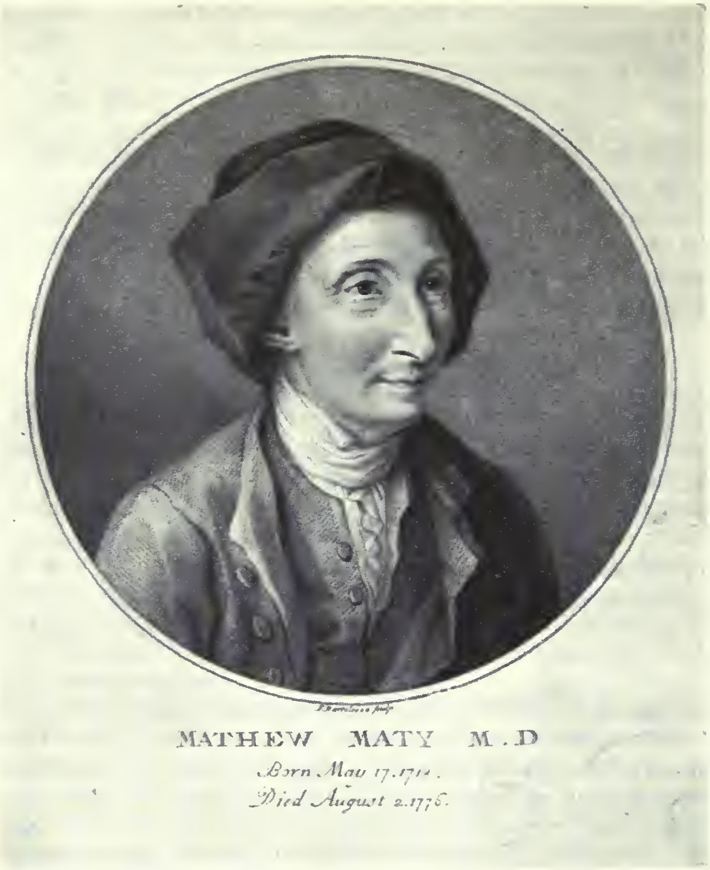

MATHEW MATY M.D
Born May 17.1718.
Died August 2.1776.

Plate 5 Portrait of Matthew Maty, 1776, engraved by F. Bartolozzi (1725–1815). (Courtesy British Museum)

no evidence to confirm his idea that the cause might have been an internal bruise from the hilt of a sword, even if a more noble concept. The heart and lungs were sound.

With Matthew Maty's passing, Charles Morton, the last of the three original Under-Librarians, and a pupil incidentally of Boerhaave's, was promoted Principal Librarian and held the position until his death in 1799. Daniel Solander remained Keeper of the Natural History Collections until his premature death at the age of 46 in 1782, when he was succeeded by his assistant, Revd Paul Henry Maty (1745–87), Matthew's brilliant, if cantankerous son, who also died early. As Maty jun. was not a naturalist an assistant, Dr Edward Whitaker Gray (1748–1806), was appointed in 1778, one of whose first tasks was the rearrangement of the Bird Room, full of Maty's specimens, according to the Linnaean system (Gunther, 1976).

Acknowledgements

Of the research for this paper, about three fourths was done at the British Museum (for Trustee's records), in the British Library for *Additional Manuscripts* and at the Williams' Library, for a copy of *Journal Britannique*. A copy of the Trustees' Minutes is now conveniently located at the British Museum (Natural History). The remaining fourth was spent at the Wellcome Library for Medical works, the Royal Society, the Greater London Record Office, the India Office Library and at the Royal College of Physicians. The privilege of being given access to material in such institutions, with the help always willingly given, must be gratefully acknowledged.

At the British Museum (Natural History) the General Library, under the librarianship of Mr M. J. Rowlands, helped secure the reproduction of documents from outside sources. The author is also indebted to Dr P. J. P. Whitehead for historical information and perspective, to Mr A. C. Wheeler for a critical appraisal of the whole paper and to Mr R. E. R. Banks and Miss D. Norman as editors for seeing the work through the press. Thanks are also due to Dr Uta Janssens-Knorsch, for expediting a copy of her thesis as soon as it came to the author's knowledge.

Acknowledgement must be made of permission by the Musée Condé of Chantilly, to reproduce their portrait of 'Le Docteur Maty', and by the Royal College of Physicians of London of an historical letter bearing Maty's signature of 30 September 1767.

Appendix 1

Journal Britannique, 1750–55

1 a Contributors who signed

Archer, Edward, MD (1718–89), physician at Small-pox Hospital
Bevis, John, MD, FRS (1693–1771), astronomer
Bolton, Etienne, astronomer
Du Plessis, J., literature
Durand, David, FRS (1680–1763), minister Savoy Fr. churches, philologist, antiquary
Floyer, Antoine, physician
Formey, J. H. S. (1711–97), Sec. Roy. Acad. Berlin
Grashuis, Johan (*c.* 1700–), physician, Dutch, MD, Leyden
Herberden, W., MD, FRS (1710–1801), physician, author, historian
Herbert, H. N., MD, physician
Jackson, John – (1686–1763), theological writer
Jortin, John, DD, FRS (1698–1770), ecclesiastical historian
Kirkpatrick, J., MD, FRS (1696–1770), physician
Layard, D. P., MD (1721–1802), physician, author
Le Cointe, Gedeon (1714–82), preacher and philosopher
Lining, J., American physician, Carolina
Needham, J. T., FRS, FSA (1713–81), divine, scientist, author
Palairet, Elias (1713–65), philologer
Palairet, John (1697–1774), French author
Porter, J., physician
Ward, John (1679–1758), rhetoric, antiquities

1 b Anonymous contributors (initials only)

Initials	*Name*	*No. of articles*	*Subject*
J.D.C.	Jean Des Champs (minister) (1709–65)	18	theology, history
P.M.	Paul Maty	15	mathematics (see also 'M' below)
C.D.M.	César de Missy (1703–75)	11	Bible scholarship
C.R.O.	unknown minister	8	theology, history
J.J.	John Jackson (1686–1763)	1	history
M.	Paul Maty (?)	6	religion
J.F.B.	J. F. Barnouin (minister d. 1770)	4	theology
E.M.	Elizabeth Montagu (?) (1720–1800), sister of Lady Wortley	2	feminism
	Total	65	

Appendix 2

The Society of Gentlemen: Birch's Thursdays' Tea
(In date order of joining)

1751 Birch, Thomas; Jortin, John; Maty, Matthew; Missy, César de, Huguenot minister attached to the Church of the Savoy: authority on Vatican archives; Young, Robert, surgeon, St Bartholomew's Hospital, Gt Russell St; Ravaud, David, FRS.

1752 Brown, John, Revd (1715–66), preacher essayist, friend of Bishop Warburton; Wetstein, Caspar, the Revd, FRS d. 1760, Chaplain to her Royal Highness the Princess Dowager of Wales

1753 Heathcote, Ralph, DD (1721–95), author
1756 Clarke, Samuel, son of the more famous Dr Samuel Clarke, DD (1675–1729) the metaphysician

Occasional visitors
Hayter, Thomas, Bishop of Norwich (1702–62), eminent divine, pamphleteer, preceptor to George III when Prince of Wales
Heberden, William, MD (1710–1801), eminent physician, historical writer, attended Warburton, Cowper, Johnson
Jeffreys, Walter, FRS, 1717
Markham, William, Archbishop of York (1719–1807)
Mason, Edward, secretary to Duke of Cumberland
Warburton, William, Bishop of Gloucester (1698–1779)
Wray, Daniel (1701–83), antiquary, assisted Lord Royston, B.M. Trustee 1765

Appendix 3

Royal College of Physicians (Register book, 1765–71)

*3 a Licentiate Committee, 1765 [*Trustees of the British Museum]*
Adee, Swithen, FRS (*c*. 1700–86)
Askew, Anthony, FRS (1722–74)
Baker, Sir George, FRS (1722–1809)
Battie, William* (1704–76)
Heberden, William, FRS (1710–1801)
Lawrence, Thomas* (1711–83)
Monro, Donald, FRS (1727–*c*. 1802)
Pitcairn, William* (1711–91)
Pringle, John, FRS (1707–82)
Warren, Richard* (1731–97)

3 b Signed letter of protest, 30 September 1767 (Plate 2)
Alexander, Benjamin (1736–68)
Archer, Edward (1718–89)
Brinkenden, John (1735–74)
Bromfield, Robert, FRS, d. 1786
Chapman, Samuel
Dickson, Thomas, FRS (1726–84)
Duncan, Sir William, d. 1774
Elliot, Sir John, d. 1786
Ford, John, d. 1806
Fordyce, George, FRS (1736–1802)
Garthshore, Maxwell (1732–1812)
Hay, Alexander, FRS
Hill, John, d. 1789
Hunter, William, FRS (1718–83)
Kennedy, Hugh Alexander, d. 1795
Maty, Matthew (1718–76)
Morris, Michael, FRS, d. 1791
Russell, Alexander, FRS (1715–68)
Silvester, Sir John Baptist, d. 1789
Wayman, Luke

Appendix 4

Dr Knight's plan for Montagu House, 14 January 1757

Agreeable to the desire of the Committee, Dr Knight delivered in *a plan for the General Distribution of Sir Hans Sloane's Collection* of natural and other products. *The Greatest and most valuable part* of this Collection consists of things relating to Natural History: wherefore that part will first claim our attention, and will merit a particular regard in the general distribution.

All the articles that come under the head may be properly classed in the three general divisions of Fossils, Vegetables and Animals. Of these the Fossils are the most simple; and therefore may be properly disposed in the first Rank; next to them the Vegetables; and lastly the animal substances. By this arrangement the Spectator will be gradually conducted from the simplest to the most compound, and most perfect of nature's productions. I would therefore humbly propose that the Fossils may be placed in the first room next to the Saloon; and when they are properly disposed, to begin with the Vegetables where the Fossils end, either in the same room or in the next according as the space will permit. In like manner the Vegetables may be succeeded by the Animals and animal substances: and since there is found in Nature a gradual and almost insensible transition from one kind of natural production to an other, I would indeavour both in the general and particular arrangement, to exemplifie those gradual transitions as much as possible.

As the class of vegetable productions will be imperfect unless a good collection of dried plants make a part thereof; such a collection seems to be much wanted to render this branch of Natural History complete. I would therefore beg leave to propose, as the *Hortus Siccuses* would take up too much room, and are already otherwise disposed of, to make a collection quite new; and to digest them according to Linnaeus' System, and deposit them in a cabinet to be constructed for that purpose according to the proportions laid down by Linnaeus himself in his *Philosophia Botanica*. His proportions are, in Paris measure 7 feet ½ in height, 16 inches in breadth, and 12 inches in depth. Such a cabinet may very well stand against one of the jambes of the windows, which are at present vacant.

If the Fossils and Vegetables can be contained in the first rooms, the room at the west end, with the lip adjoining, will remain for the Animals and animal substances.

Some of the Vegetables, and a considerable and valuable part of the Animals are preserved in spirits, and would be a great ornament to the Collection if placed in the cabinets; and I presume it would give more satisfaction to the publick to see them each arranged there with the things of the same kind, than to have them put together in the Base Story.

At the same time the Monsters and anatomical preparations, will be best joined with the skeletons, and other parts of anatomy in the Base Story: more especially as all these are not proper objects for all persons, particularly women with child. The large room in the Base Story at the west end will be very fit for this purpose; and being under the rooms to which its contents belong, will have a communication with it by the back stairs. If on account of this disposition the two rooms allotted to the animalia should be found too small to contain the whole, a continuation of this class may be made in the two rooms adjoining the Committee room.

As to the antiquities they may be put in the largest room in the Base Story at the east end, to which the next room may be added if necessary. This situation will be the more proper on account of the medals, if they should be placed above, as there will be a communication by the back stairs.

The little room at the west end opening upon the back stairs may contain the miniature pictures, and a cabinet of some of the most valuable and curious productions of art. The rest may be put in the Base Story, as also the instruments, habits, indian curiosities, etc.

Ordered that the sum of one hundred pounds be impressed to Dr Knight by a draught upon Mr Race. The draught was accordingly made, and signed by the Trustees present.

Meeting adjourned.

(B.M. Trustees Reports, 1738–84 **1** (21): 51–52)

Appendix 5

Maty's plan for catalogues, February 1770

Dr Solander, a few days before he left England, put into my hands his papers relative to the Catalogue of the objects of Natural History that they might be ready in case the Trustees should think proper to make use of them.

It appeared, upon a review of these papers, that the first and chief object of the Doctor had been the Plants and Insects; both which he examined and described in a manner, which does great honor to his learning and industry; and these parts, indeed the most intricate, of the work may now at any time be easily completed. But with respect to the other classes, except a few Animals and Birds, nothing appears to have been done, and the fossils, fishes, serpents etc. as well as the Antiquities and artificial curiosities, remain entirely untouched.

Yet as the business of the Catalogue seems to be of very great importance, both to ascertain what we have, and to separate the duplicates, it were to be wished that some other hand might be engaged in the same work, as there certainly will be employment for more than one man.

This is still become more necessary, since, by the accessions of several new articles, and chiefly by the late purchase of rich collections of birds and land animals, these two classes have been considerably increased, and will probably be more so from future acquisitions.

As these new objects, together with those which we had before, are now intended to be placed in a systematical arrangement, it will naturally fall in my way, tho' with a considerable increase of labour, to make a Catalogue of these two classes.

I, therefore beg leave humbly to offer myself to the Trustees, and if they should think proper to allow me the same appointment, which my Assistant Dr Solander enjoyed for some years, out of a donation of money from his Majesty – which was applied to that use, I would engage:;

1. In the course of a twelve month, to begin at Lady Day next, to prepare and finish a Catalogue of the two first classes of the Linnean System of Animals, viz the *Mammalia* and the *Aves*, consisting of proper descriptions of the Objects in these two Classes, which we now have or may acquire in that time, together

with the Synonims in the chief languages of Europe, and such particulars as might render these descriptions interesting;

2. At the end of the said twelve month, to go on with the other classes, and if Dr Solander should, on his return, still be at liberty or inclined to pursue his work, to agree with him about the parts which he might reserve to himself, or rather to assist one another in the same great undertaking.

I beg leave to add, that, should the Trustees think proper to employ me in this work, it shall not prevent my discharging my duty in other respects, as one of the Officers of the Museum.

M. Maty

(B.M. Trustees Reports, 1738–84 **1**: 246–8)

Appendix 6

His Majesty's Sign Manual for appointment of Principal Librarian, 21 July 1772

Dr Maty attended the Committee and delivered at the Table His Majesty's Sign Manual appointing him Principal Librarian of the Museum which is as follows:

George R.

Whereas by an Act of Parliament made in the Twenty-Sixth Year of the Reign of Our Royal Grandfather, Intituled an Act for the Purchase of the Museum or Collection of Sir Hans Sloane, & of the Harleian Collection of Manuscripts, & for providing One general Repository for the better Reception and more convenient Use of the said Collections, and of the Cottonian Library and of the Additions thereto; It is Enacted that the Principal Librarian, to whom the Care & Custody of the said General Repository shall be chiefly committed, shall be nominated and appointed in Manner following, (that is to say) the Archbishop of Canterbury, Lord Chancellor or Lord Keeper and the Speaker of the House of Commons, or any two of them, shall recommend to his said Majesty, his Heirs, and Successors two Persons, Each of whom, They shall judge fit to execute the said Office and such of the said Two Persons so recommended, as his said Majesty, his Heirs, & Successors, by Writing under His or Their Sign Manual shall appoint, after He shall become bound to the Trustees of the British Museum for the due and faithful Discharge of His Office in such penal Sum, not being less than One Thousand Pounds as the said Trustees at any General Meeting assembled, or the Major Part of them shall think proper, shall have and hold the said Office during such time as he shall behave well therein; And whereas the Most Reverend Father in God and our faithful Councillor Frederick, Archbishop of Canterbury, Primate and Metropolitan of all England, & Our Right, Trusty and Wellbeloved Councillor Henry Lord Apsley, our Chancellor of Great Britain by Writing under Their Hands, have humbly recommended unto Us, Charles Morton and Matthew Maty, Doctors of Physic in Pursuance of the said Act; We have constituted and appointed by these Presents pursuant to the said Act, do Constitute and appoint the said Matthew Maty, Doctor of Physic, to be the Principal Librarian, to whom the Care and custody of the said General Repository of the British Museum shall be chiefly committed; And that the said Matthew Maty shall (after giving such Security as is required by the said Act) have and hold the said Office during such time as He shall behave well therein, according to the true Interest and Meaning of the said Act.

Given at Our Court at St James the 21st day of July 1772 in the Twelfth Year of Our Reign.

By His Majesty's Command,
Rochford.

(B.M. Trustees Minutes, 1772: GM 1347, C1346–8)

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Charles Darwin's Notebooks, 1836–1844

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Darwin's notebooks provide an invaluable record of his scientific thinking and, most importantly, the development of his theory of natural selection. This edition of the notebooks, prepared to the highest modern standards of textual editing, thus affords a unified view of Darwin's professional interests.

The *Red Notebook,* used on the voyage of H.M.S. *Beagle* and afterwards in England, contains Darwin's first evolutionary statements. In July of 1837, Darwin began his 'Transmutation Notebooks' (B–E) devoted to the solution of the species problem, and in the third notebook of this series he first formulated the theory of natural selection. To this can now be added another species notebook reconstructed from loose sheets; this 'Torn-Apart Notebook' represents the fifth Transmutation Notebook.

This volume also contains Notebook A on geology, Notebooks M and N on man and behaviour, and other notebook and manuscript materials from the period 1836–1844.

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D. R. C. Kempe & H. A. Buckley

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Fifty years of oceanography in the Department of Mineralogy, British Museum (Natural History)

D. R. C. Kempe & H. A. Buckley

Department of Mineralogy, British Museum (Natural History), Cromwell Road, London SW7 5BD

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Introduction

The study of oceanography in the Department of Mineralogy in the British Museum (Natural History) began in a somewhat tortuous way. From the nineteenth century most of the rocks collected by the early voyages of exploration and scientific investigation would ultimately have been presented to the Museum. Although its staff had little or no involvement in these expeditions, the policy of presenting biological and geological collections to the Museum continued during the period following the classic voyage of HMS *Challenger*, 1872–76 (see p. 87), and between the two World Wars. At this time the British oceanographical effort tended to be associated with the investigation of Antarctica, generally centred on the study of whales and their environment, in the RRS *Discovery*, *Discovery II* and *William Scoresby* (Deacon, 1984).

The establishment of an Oceanography Section in the Department of Mineralogy began with the acquisition from the Department of Zoology in 1935 of the Sir John Murray Collection, which included much of the extensive collections of zoological, botanical and geological specimens made by HMS *Challenger* (Lingwood, 1981) (Plates 1–2). The *Challenger* collection in the Section contains only sediments and the relatively few rocks that were taken. This paper does not attempt to give an account of the *Challenger* expedition, or of its collections; for this the reader is referred to Linklater (1972).

In succeeding pages the history of how the Sir John Murray Collection came to the Museum is traced, followed by a brief account of the John Murray Expedition to the Indian Ocean, financed by income from the Christmas Island Phosphate Company. The establishment of the Oceanography Section in the Department of Mineralogy follows, with an account of the birth of the National Institute of Oceanography. Two aspects particularly link the early days of the NIO with the Museum: the involvement of John Wiseman in its planning stages, and the

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Plate 1 HMS *Challenger* at anchor in the outer harbour of St Thomas, Danish West Indies.

work of N. A. Mackintosh and the Whale Research Unit in the Museum's grounds. The development since the war of the Oceanography Section is described and some of the more interesting items in the collection are mentioned. A brief summary of the major research activities of the Section is given, with selected references, and finally, an account of the Antarctic expeditions as an appendix. In the case of the Antarctic collections, references to research conducted outside the Section and outside the Museum are provided in the catalogue references frequently quoted.

The Sir John Murray Collection

Sir John Murray, KCB,[1] who was knighted in 1898 (Herdman, 1923), was one of the naturalists on the four year (1872–76), 111 110 km voyage of HMS *Challenger* with Captain G. S. Nares and Professor C. Wyville Thomson, whose natural successor he was to become. He was a candidate in 1881 for the first Directorship [Superintendentship] of the British Museum (Natural History), but was considered too forthright in his manner by the Archbishop of Canterbury and the other Trustees: the post went to Richard Owen. Murray now worked, in collaboration with the Belgian, Abbé Renard, on the sediment sounding samples which formed the bulk of the *Challenger* deep-sea deposits and were in his charge (Plate 3). Their report (Murray & Renard, 1891) was one of the 50 volumes or part volumes, of which Murray wrote seven, which described the voyage. During this time, the collection was housed at the Challenger Expedition Commission's Office at 32 Queen Street, Edinburgh. In 1890 the Office moved to 45 Frederick Street and presumably the collection went with it, until this second office was given up in about 1904. In this year Murray bought the Villa Medusa (M. Deacon, in prep.). Meanwhile, in 1897, Murray had acquired as his residence Wardie Lodge, in Wardie, Granton, a northern suburb of Edinburgh, and changed its name to Challenger Lodge – it is

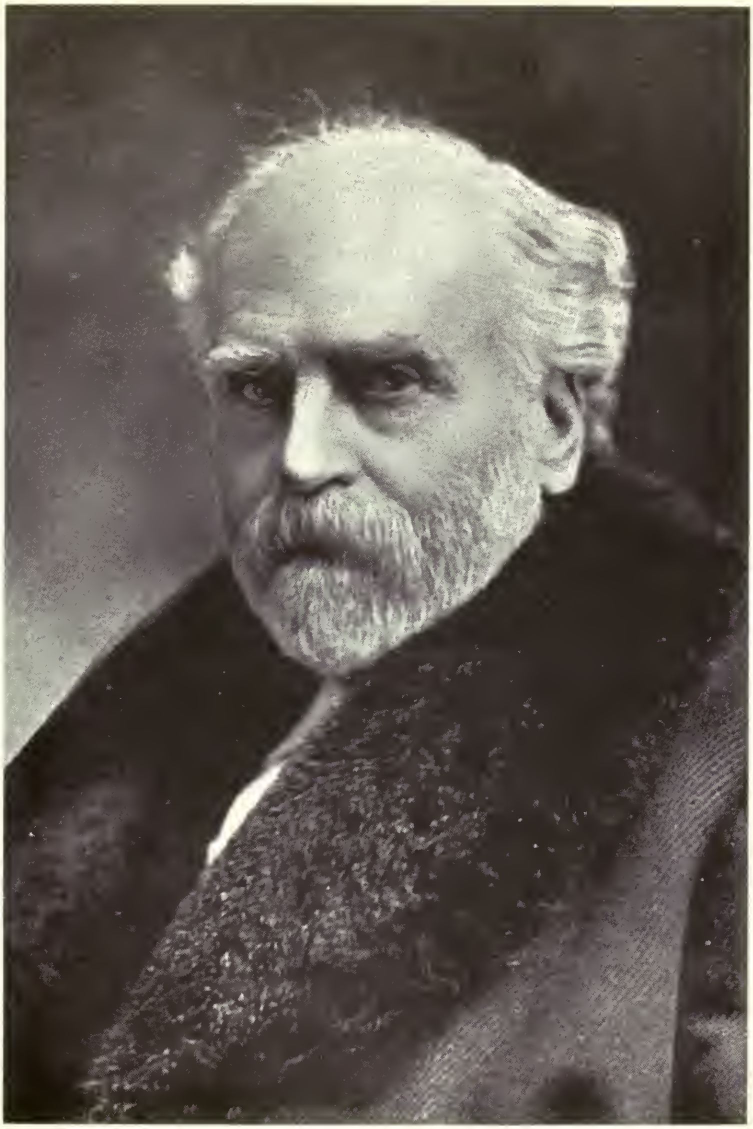


Plate 2 Sir John Murray.

now St Columba's Hospice (Plate 4); the Villa Medusa was just across the road (Plate 5). It was here that Murray and Mr James Chumley, formerly Sir John's secretary for many years, and in whose care lay the curation of Murray's whole collection, which included many specimens other than those collected by the *Challenger*, transferred the entire collection in 1904. Here it stayed until 1922, when the house was sold, the year after the collection was acquired by the British Museum (Natural History). The name, however, was transferred to another house further up the road, which became 'Medusa Cottage'.

Murray was killed near Edinburgh in a motor accident on 16 March 1914, leaving a widow, two daughters and the two sons, John Challenger and Thomas Henderson. Shortly before this, however, he was visited by Edward Heron-Allen, to seek his advice and to discuss the disposal of the collections in the event of his death. Initially, he had intended to leave them all to his two sons, whom he hoped would carry on his work. Later, however, he had 'been made aware

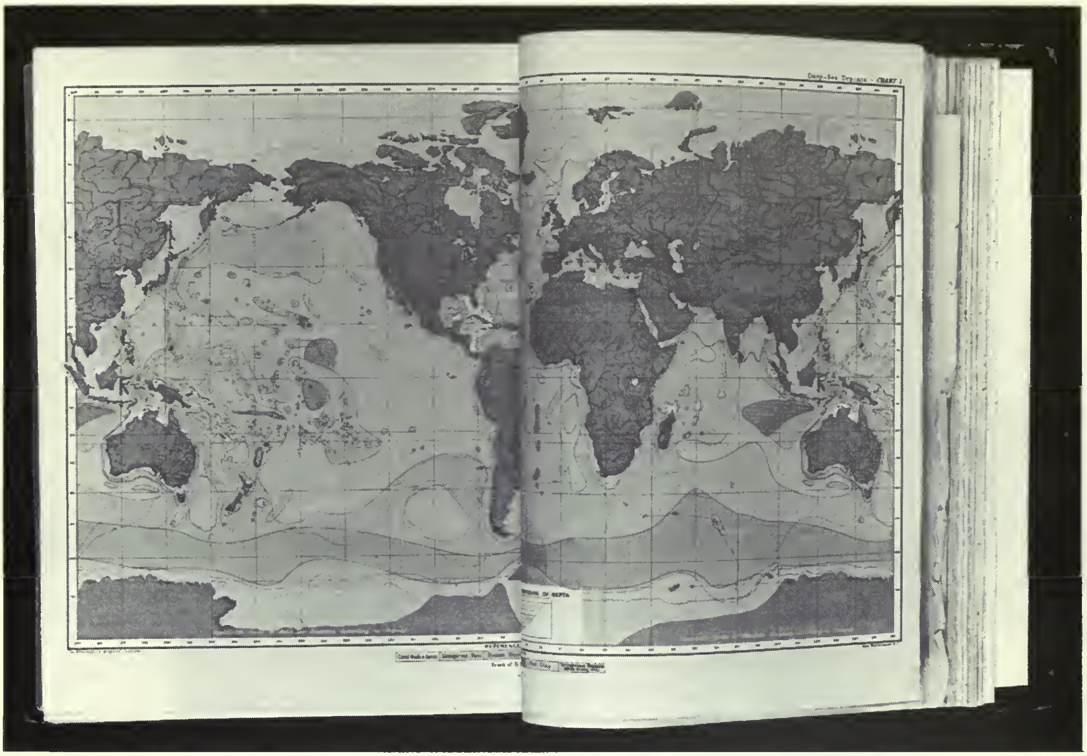


Plate 3 The distribution map of marine deposits from Murray & Renard (1891).

that his sons' tastes and feelings lay in other directions'; therefore he would have to make other arrangements for their disposal. After lengthy discussions he decided that the collections should go either to the British Museum (Natural History) or to the Imperial College of Science [University of London], where they would be put in charge of a responsible curator whose first duty would be to catalogue and index every sample. Murray planned to set up a fund for the curator, to 'make it worthwhile', and to leave a legacy to cover the removal expenses. However, he died before any of this could be arranged. Chumley, now a Demonstrator in Zoology in the University of Glasgow, continued to make repeated visits to the Villa to keep it and the collections in order.

Chumley wrote to Edward Heron-Allen on 8 April 1914[2] concerning the trust fund Sir John Murray had planned for oceanographical research. Chumley had had a long talk with Lawrence Pullar, a lifelong friend and trustee of Murray's estate; Pullar had said that no precise instructions had been left in his will. J. C. Murray and his mother, Lady Murray, wondered whether Sir John had confided his intentions to Heron-Allen. The next day Heron-Allen wrote to Pullar concerning the disposal of the collection, mentioning that Sir John's two sons had had a change of heart concerning oceanography, leading to Sir John's plan to set up the fund to provide income sufficient to make it worth while for a curator to look after the collection.[3] Replying to Heron-Allen on 10 April,[4] Pullar enclosed notes on what he considered Sir John had in mind for the collection. Since his sons were under age, the problem of the disposal of the collection would have to wait until they came of age.

This is the background to the lengthy report of 28 pages, dated 21 January 1920[5] and written by Heron-Allen (who referred to himself as 'one of your reporters') and his assistant, Arthur Earland, of the British Museum (Natural History), where they worked on recent foraminifera. It was written at the request of the Director, Sir Sidney (Frederic) Harmer, who was also Keeper of Zoology, and described the contents of the Villa Medusa. The reason for the delay –

Plate 4 Challenger Lodge. Formerly Wardie Lodge, now St Columba's Hospice, northern Edinburgh.

from 1914 to 1919, almost a full five years – had perhaps been made clear in a letter to Sir Sidney Harmer from Lady Murray, Sir John's widow, dated 12 June 1919.[6] Lady Murray was replying to a letter from Sir Sidney, dated 7 June,[7] in which he stated that he had recently met the Hydrographer of the Navy, Admiral Sir John (F.) Parry, and was enquiring whether the Museum might acquire the collection. Lady Murray stated that her sons would be responsible for the collection 'when my youngest boy comes of age next September'. Almost at once the older, J. C. Murray, also wrote to Sir Sidney, on 15 June 1919,[8] requesting a meeting to discuss the disposal of the collection. He mentioned that his father had 'desired that the whole collection should be kept together and not split up into different parts. And I remember that this is what he was afraid would happen if they were sent to the British Museum . . .'. Harmer replied on 20 June, suggesting they should meet, with Charles Edward Fagan, previously Assistant Secretary and now Secretary of the Museum, at the Museum on 8 July 1919.[9] Their meeting was followed by a visit, proposed by Murray,[10] by Sir Sidney to the Villa Medusa, 'just opposite my mother's house, Challenger Lodge', on 14 July, where he met Chumley and inspected the collection. Heron-Allen also met Murray, and on 26 November Murray wrote to Harmer expressing the hope that Heron-Allen would be able to visit the Villa, perhaps on 8 December, to meet Chumley and examine the collection.[11] In a preliminary report to Trustees, dated 14 November 1919,[12] Harmer discussed his July visit and recommended that the offer of Heron-Allen and Earland to inspect the collection be taken up. It was agreed that the visit should take place and on 22 November Harmer wrote to Murray and Heron-Allen to make the arrangements for the visit; Heron-Allen and Earland would travel up on the night of 7 December and visit the Villa the next day.[13] There was then some doubt as to whether Chumley would be there or not; Harmer wrote again on 4 December[14] saying that the visit should take place in any case and this is how it turned out.

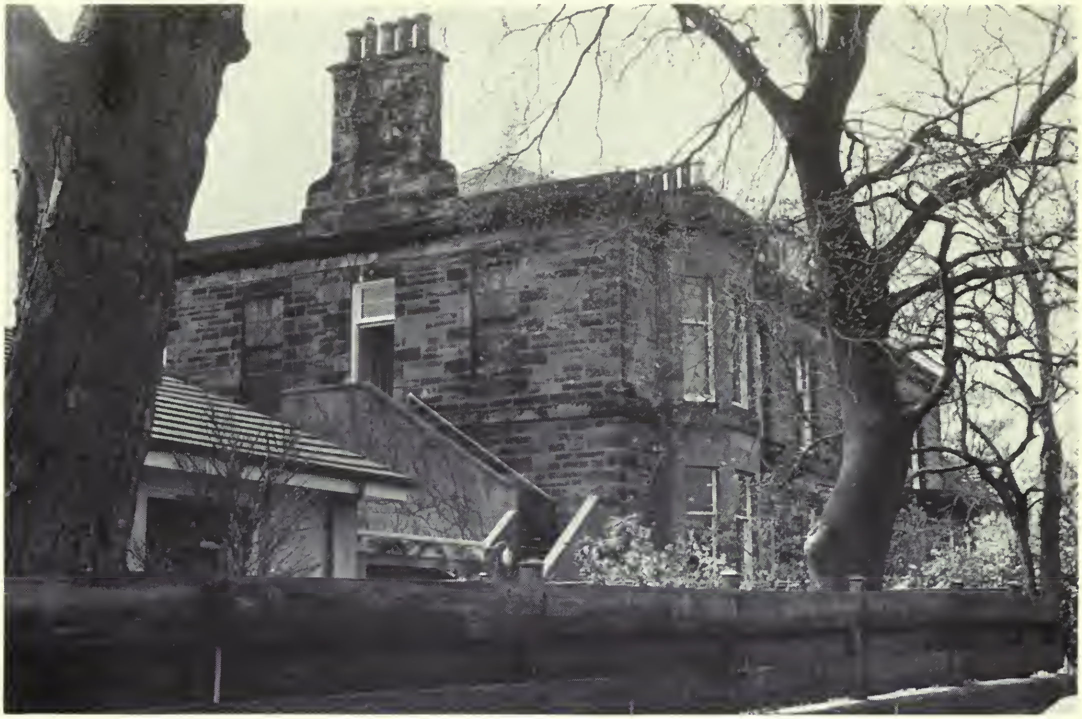
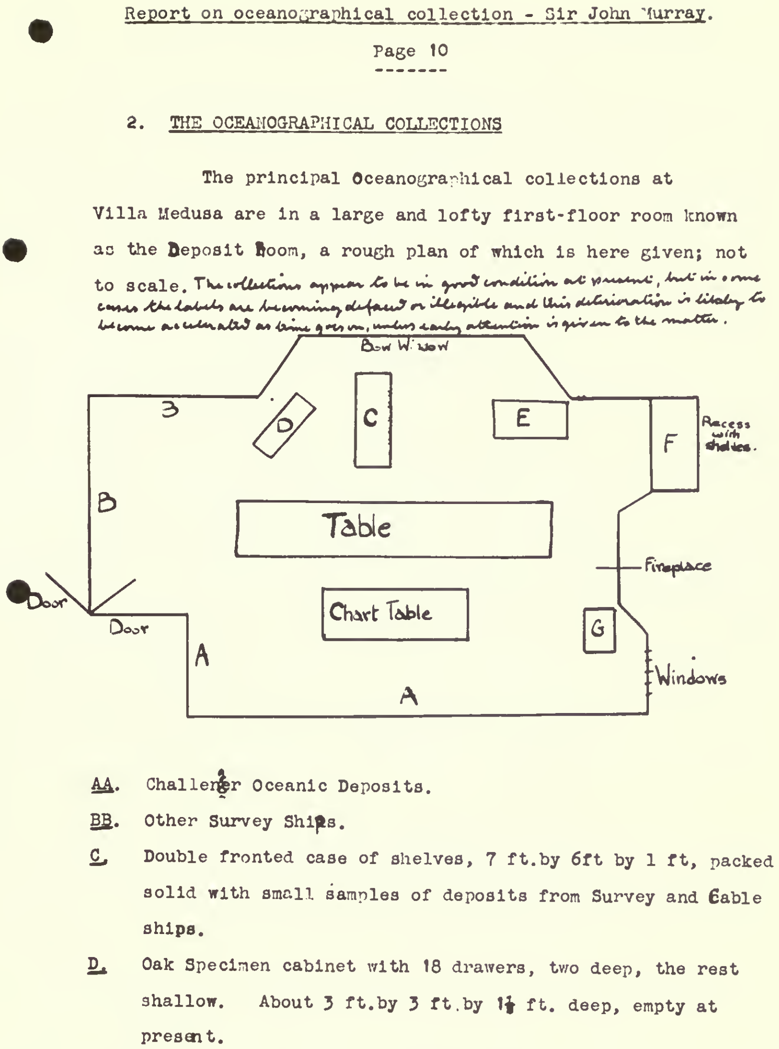


Plate 5 The Villa Medusa: 14/16 Boswall Road, Wardie, Granton. The house is almost opposite Challenger Lodge. Note the 'Deposit Room', on the first floor, with the bow window.

Heron-Allen and Earland found the Villa Medusa to be a large semi-detached house, No. 14 Boswall Road (M. Deacon, in prep.).[15] The main room was a 'large and lofty first-floor room known as the Deposit Room' (Plate 6); it had a bow window and contained the 'soundings and dredgings' from the Challenger Expedition, together with smaller collections. The *Challenger* material, arranged in bottles and boxes on ten shelves, occupied a total of 51·5 m of shelving. The remainder, collected by at least 36 survey and cable ships, mostly British but with some from the United States of America and at least one from Russia, spanned the world and included miscellaneous collections of phosphates, glauconite, nodules and other materials. The largest collection by one ship occupied 10 m of shelving, with several occupying less than 30 cm; they totalled some 91 m. It is interesting to note that until 1868 all survey ship collections were stored by the Geographical Survey. They were acquired by Sir John Murray when he formed his collection and include the early cable ship collections from the Atlantic and Indian Oceans, of great historical interest. The rest of the Villa was also used to house the library, apparatus and miscellaneous items, with a ground floor laboratory. Two outbuildings in the garden to the rear – a two-room Chemical Laboratory and a large shed – were also utilized.

It was recommended by Heron-Allen and Earland that the oceanographic equipment and the Scottish Lakes Survey specimens should be donated to the University of Edinburgh for its projected Marine Biological Station [Department of Oceanography]. The 'Philosophical Instruments and Apparatus' should go, as most eventually did, to the 'Scientific Apparatus Collection' [Science Museum] at South Kensington, London, the remainder coming to the British Museum (Natural History).

They found the collection in good condition, although some of the labels were becoming defaced or illegible. They recommended that all the main collection of 9746 Marine Deposits,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Report on oceanographical collection - Sir John Murray.

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2. THE OCEANOGRAPHICAL COLLECTIONS

The principal Oceanographical collections at Villa Medusa are in a large and lofty first-floor room known as the Deposit Room, a rough plan of which is here given; not to scale. The collections appear to be in good condition at present, but in some cases the labels are becoming defaced or illegible and this deterioration is likely to become accelerated as time goes on, unless early attention is given to the matter.

AA. Challenger Oceanic Deposits.

BB. Other Survey Ships.

C. Double fronted case of shelves, 7 ft. by 6ft by 1 ft, packed solid with small samples of deposits from Survey and Cable ships.

D. Oak Specimen cabinet with 18 drawers, two deep, the rest shallow. About 3 ft. by 3 ft. by 1½ ft. deep, empty at present.

Plate 6 Plan of the 'Deposit Room', from Heron-Allen and Earland's report.[5]

soundings, etc., together with the library, including the *Challenger* expedition glass photographic plates, and the microscopical preparations, should go to the British Museum (Natural History), to form the basis of the Oceanographical Collections. They recommended the employment of a Curator who, whilst needing some specialist knowledge, would not be engaged full-time on the collection. His main tasks would in future be to '[receive, register and arrange] such further material from Cable Companies and other bodies', while the 'Admiralty would no doubt be glad to supply the material collected by its Survey ships, and thus in time the Collections would assume a world-wide importance and become of great commercial utility'; after the Second World War, the Admiralty did indeed agree to donate their sounding samples to the Museum.

On 23 December Dr Charles Tate Regan, later to become Keeper of Zoology in the British

Museum (Natural History), wrote to the Director of the Museum informing him that the visit of Heron-Allen and Earland to the Villa Medusa had alerted the University of Edinburgh, who might now try to persuade Lady Murray to give them the collections.[16] So when, on 4 January 1920,[17] Lady Murray wrote to Harmer saying that her sons were 'finding it hard to know what is best to do' with the collection, the Director was in no doubt. On 10 January[18] he wrote to Dr Arthur Smith Woodward, Keeper of Geology, telling him that the Museum might be offered the collection and asking him his opinion on whether it should accept; if so, should it be amalgamated with the 'duplicate' *Challenger* specimens, one from each station, presented to the Department of Geology by Sir John Murray on 6 March 1895. Woodward replied in the affirmative,[19] speaking also on behalf of his successor, Dr Francis Arthur Bather, and saying that they thought the collection should not be subdivided. As will be seen, the collection came in fact to the Department of Zoology, the 'duplicates' being transferred to Zoology on 6 October 1922 and finally to the Department of Mineralogy in 1938.

By now – 12 January – Professor J. H. Ashworth of the Department of Zoology, University of Edinburgh, had written[20] asking for the duplicate *Challenger* and *Knight Errant* specimens for their proposed new Department of Oceanography. Ashworth seemed nevertheless happy that the main collection should go to the British Museum (Natural History) and Harmer mentioned this in his report to Trustees of 19 January 1920.[15] He recommended that the two reporters – Heron-Allen and Earland – should be warmly thanked and made it clear that he considered the collection of 'marine deposits and animals' should come to the Museum on the recommendations of their lengthy report, formally dated 21 and 24 January and submitted to Trustees on 20 January.[21] He added that Sir John Murray's wish to donate money to pay for a curatorship of the collection had never been carried out. Finally, he also mentioned that the initiation of a Department of Oceanography at Edinburgh was under consideration.

Also on 20 January,[22] J. C. Murray wrote to Fagan to ask if any date had been fixed for the removal of the collection: his mother was selling her house – Challenger Lodge – and also part of the grounds of the Villa Medusa. He also suggested that James Chumley be employed at the Museum to curate it. On 30 January, the Director wrote to Lady Murray saying that Trustees would welcome an offer from her and her family to present a substantial part of Sir John's collections to the Museum.[23] They were consulting the Admiralty, through the Hydrographer, Admiral Parry, to ascertain their views, and felt that the proposed acquisition would 'appropriately form the nucleus of a great collection illustrating Oceanography in the British Museum (Natural History)'. If such an offer was made, the Trustees would endeavour to find suitable accommodation for the collection and 'use their best efforts to place it in the charge of a suitable Curator', subject to the consent of the Treasury for the new expenditure. Harmer ended by saying that Lady Murray would be very welcome at the Museum should she wish to discuss these matters further. Also in the letter were paragraphs repeating the recommendations of the reporters for the donations to the University of Edinburgh and the Science Museum. Lady Murray replied on 31 January[24] saying – rather surprisingly – that her sons were deciding what to do with the collection. On 2 February[25] J. C. Murray wrote to Harmer, requesting a meeting; he wrote again on 4 February 1920 erroneously regretting the news that Fagan had died (he died early in 1921) and making mention of accommodation in the British Museum proving difficult: he would ask the other trustees of his father's estate about a curator for the collection.[26]

Matters began to be resolved in the middle of March, when J. C. and T. H. Murray wrote on 18 March[27] to the Director, offering the collection and listing the conditions under which the Sir John Murray Collection would be donated to the British Museum (Natural History). The Murrays' family solicitor may well have drawn up the list, which stated:

1. The Museum agrees to accept the John Murray library and sediment collection on condition they are kept together and known as the Sir John Murray Collection.
2. Additions can be made; indeed it is hoped that they will form the nucleus of a larger Oceanographical Department. The whole to be in the care of a suitable Curator.
3. Duplicates of books, etc, not required are to be returned to the Villa Medusa, Edinburgh.

In the Minutes of Standing Committee dated 24 March,[28] Trustees said that they accepted the conditions as written. On the recommendation of the Director to Trustees on 21 April, Fagan wrote formally to J. C. Murray on their behalf on 29 April 1920,[29] recording their acceptance of a month earlier.

Few things are quite so simple, however. The duplicate books, required by Condition no. 3 to be returned to Edinburgh, seem to have been included with the Museum collection. On 26 June Trustees were informed that Harvard University, Cambridge, Massachusetts, had requested Murray to return the *Albatross* specimens, belonging to them, which they had sent to Sir John Murray.[30] Also, C. E. Fagan, the Secretary, had to inform Trustees that the Assistant Secretary of the United States National Museum had requested the return of the USS *Tuscarora* samples, along with those from the *Thetis*, *Blake* and *Bibb*. The conditions of their donation to Sir John Murray were not known but it was clear that J. C. Murray had understood that they were his to keep. In his letter to Murray of 14 October 1921,[31] Harmer stated that Chumley had admitted that the *Albatross* collection did belong to Harvard. Presumably these samples were returned, since they are no longer in the Museum collection, whilst some at least from the *Blake*, *Thetis* and *Bibb* are still in the British Museum (Natural History); nevertheless, on 16 October 1926[32] a further request for their return was reported by Dr Tate Regan, Keeper of Zoology, to Trustees.

Whilst in late August to early September 1920 the British Association meeting in Cardiff was recommending a new *Challenger*-type expedition to investigate the oceans, there was difficulty, also, in finding accommodation for the new and important donation. An application dated 12 August 1920[33] to the Office of Works (now absorbed within the Department of the Environment) for the return by the Board of Education of the galvanized iron temporary building known as Block C was turned down in a reply to C. E. Fagan dated 9 September 1920.[34] A further letter to the Office of Works (20 October)[35] requested alternative accommodation; a reply on 1 December[36] somewhat reluctantly offered part of Block B (see p. 71) followed later in the month when a rough plan of the block (of 437 m^2) was sent to the Department of Zoology.[37] The offer of this accommodation was accepted on 31 January 1921,[38] although considerable alterations to the fittings needed to be done: a figure of £500 was mentioned.

The major problem now, however, was that of a Curator. The Director wrote to J. C. Murray on 31 January 1921,[39] regretting Fagan's death the previous day, mentioning the difficulty over accommodation, but mainly concerned with the lack of money for 'an assistant'. Could Murray help, as his father had indicated was his intention? If the Treasury allocated the money, Trustees would consider employing James Chumley; otherwise, could he be lent to the Museum to pack up and unpack the collection? Murray replied on 7 March:[40] his family was unable to provide a permanent Curator but would pay Chumley's expenses for a few months. He offered to visit the Museum to discuss the matter with the Director. Accordingly, Harmer wrote on 16 March[41] to Professor Graham Kerr, in whose Department (Zoology in the University of Glasgow) Chumley was now a Research Fellow. Could he be spared for a few months – the Murray family were prepared to pay his expenses – and, if Treasury sanction was obtained, what would be the chances of his taking up permanent employment, and what did Kerr think of him? Professor Kerr replied on 9 April,[42] speaking of Chumley in the highest terms. He was ideally suited to be the permanent Curator of the Murray Collection and had all the necessary knowledge to conduct and direct research on the material. But he was 59, now a Research Fellow, doing various jobs in the Department, including giving a summer course of lectures on Oceanography, and drawing total emoluments of £400 p.a. Nor did he want the temporary job of moving the collection. Harmer wrote back to Kerr on 18 April.[43] Chumley was really too old; ten years' service was the minimum required for a pension and the Museum should try for a younger man. But would Chumley work for a few months, paid by the family, to supervise the move? Kerr handed this letter to Chumley, asking him to reply to it. This he did, on 20 April,[44] in no uncertain terms. Enclosing a copy of a long letter on the same subject he had written on 21 March to J. C. Murray, he outlined his terms and conditions for salary and pension. He cited his 12 years of Government service in the Challenger Office, and a colleague who had had his similar service treated as reckonable for pension purposes. He felt that all the arrangements regarding the transfer of the Murray Collections should have been discussed the previous year and ventured to suggest that the removal be deferred until, say, 1 April 1922, 'that in the meantime the Museum may decide upon the policy to be adopted, may approach the Treasury with a definite scheme, and the approval of the Treasury secured before 1st January 1922, enabling [him] to give the University Court three months' notice of [his] resignation'. Any temporary arrangement was out of the question as being hardly fair either to the University or to himself. Perhaps predictably, Harmer wrote to Charles Tate Regan, Keeper of Zoology, who was to succeed Harmer as Director, on 21 April:[45] in effect, he was not impressed. Regan replied on 25 April[46] that it seemed as if the Museum must do without Chumley. Harmer wrote to Murray on 28 April,[47] thanking him for his letter saying that Chumley did not want to be employed in a temporary capacity, and saying how awkward Chumley was being and should the whole idea of employing him be abandoned. Murray replied on 1 May saying that he could not understand Chumley's behaviour, and agreeing that any question of employing him should be abandoned. Harmer wrote on 3 May to Kerr, thanking him for his help and saying that the matter was being dropped, and in similar terms on the same day to Chumley. There was, for the time being, to be no Curator of the collections.

On 18 July 1921[48] Tate Regan wrote to Trustees about the fitting out of Block B and a proposed date for the removal. He followed this with a letter dated 26 July[49] to J. C. Murray, asking when the removal could be arranged. Murray wrote to Dr W. T. Calman, Deputy Keeper of Zoology, on 29 July[50] to initiate the arrangements for the move. Messrs Sloan and Son, Ltd., of Edinburgh, were to carry out the work; the move would be by van, rail and sea. Dr Calman would oversee the initial stages but the bulk of the supervision of the packing would be in the hands of Mr G. A. Smith, Clerk, of the Department of Zoology, who replaced the previously suggested Mr W. E. Barnett.

On 13 October 1921[51] Dr Tate Regan was able to report to Trustees that the John Murray Collection had arrived safely in the Department of Zoology. The following day,[52] the Director, Sir Sidney Harmer, wrote to inform J. C. Murray of this fact. On 18 October[53] Regan wrote to Calman about the rocks in the Collection and asked also in whose name the Collection had been presented. The last official letter concerning the presentation was that of the Director, on behalf of Trustees, of 15 November,[54] to J. C. Murray. The historical instruments reached the Science Museum as arranged, except that the balance and some microscopes were transferred to the room of Dr G. T. Prior, Keeper of Mineralogy; they are still in the Department.[55–60] Murray's solicitors,[61] supported by the Museum, succeeded in convincing the Inland Revenue that – apart from the library – the Collection was of 'no commercial value' and therefore was not liable for estate duty. But the question of a Curator was to be raised once more before the post-war economic situation was allowed to inhibit any further action for more than a dozen years. Robert Dykes, who had been Chumley's assistant, applied for the curatorial post. The Director wrote[62] to Professor Stanley Gardiner in Cambridge for a reference, but Gardiner did not remember Dykes.[63] He took the opportunity, however, to inveigh against a mob of 1500 undergraduates who had recently attacked the great bronze gates of Newnham College with a cart, to the tune of £600 worth of damage. Harmer then asked Dr F. A. Bather,[64] who spoke well of Dykes.[65] But there was as yet no money and on 26 October Harmer replied to Dykes regretting that the Museum was unable to offer him a job.[66] There was still no Curator, but at least – and at last – the Sir John Murray Collection was safely housed in Block B, in the care of the Department of Zoology (Plate 7).

The John Murray Expedition

On 19 May 1932[67] Professor J. Stanley Gardiner, of the Zoological Laboratory, University of Cambridge, wrote to the Chairman of Trustees of the Museum. He stated that Sir John Murray had left the income from 250 shares in the Christmas Island Phosphate Company – on the Indian Ocean guano island, not the better known Pacific Ocean island – to be spent on

Plate 7 Part of the *Challenger* collection of deep-sea sediments, manganese nodules and rocks, in the Department of Mineralogy.

'scientific research or investigations or explorations which are likely to lead to an increase in natural knowledge and especially in the science of oceanography and limnology'. About £20000 had accumulated (Burstyn, 1975) and it had been decided to send an expedition to the western Indian Ocean under the leadership of Lieut.-Col. R. B. Seymour Sewell, with Dr E. F. Thompson as deputy (Rice, 1986). The choice of this ocean was apt, since only the southern part had been visited by the *Challenger* and Murray himself had noted the omission. The collections taken were to be offered to the Museum to be added to the Murray Collection, 'but not to be kept in any way apart from the general collections of the Museum'. Dr C. T. Regan, then Director of the Museum, replied to Gardiner on 3 June:[68] Trustees would be pleased to accept the collections and had appointed himself (Regan) as Museum representative on the committee being formed to organize the John Murray Expedition, of which J. C. Murray was appointed Chairman on 20 June 1932. The Hydrographer of the Navy, Vice-Admiral Sir John (A.) Edgell was also a member. The cruise would last nine months and Trustees of the Museum would contribute up to £200 for storage bottles, etc.[69–70]

After various ships had been considered, including the RRS *Discovery*, the *William Scoresby*, the Danish research ship, *Dana*, and the *George Bligh*, the expedition took place from 1933 to 1934 in His Egyptian Majesty's Ship *Mabahiss*, under the command of Captain K. N. MacKenzie, which King Fuad and his government had loaned to the organizers (Plate 8).

Plate 8 HEMS *Mabahiss.*

On 22 October 1934[71] Murray wrote to the Director reminding him that a duplicate set of specimens had been promised to the Egyptian Government in return for the loan of the *Mabahiss*. On the same day, Murray also wrote to the Director asking whether Trustees would undertake the publication of the scientific results of the expedition; the Director replied on 13 November[72] in the affirmative, and the results are contained in 11 volumes of scientific reports, published between 1935 and 1967 and arranged according to the three main lines of research undertaken: the physical and chemical characteristics of sea-water at all depths; the general topography and nature of the sea-bottom; and the collection of deep-sea fauna, especially from the depth zone between 100 and 2000 metres. As agreed, the collections were to come to the Museum and a year later there was to be some correspondence concerning the specially fitted cabinet required to house the cores taken on the expedition.

After some diplomatic correspondence in 1939,[73–75] it was agreed that the duplicate specimens would be sent to the Fuad 1st Institute of Hydrobiology and Fisheries, Alexandria, and not to the rival University of Cairo. The war, of course, intervened and it was not until the winter of 1949–50 that, after further correspondence[76] about to whom to send them and who should pay the freight, they finally arrived in Alexandria.

The Oceanographical Room

On 27 July 1934[77] J. C. Murray wrote to Professor Gardiner to ask what was being done about a Curator for his father's Collection; the then Director, Sir Sidney Harmer, had promised a quick appointment and the family felt 'badly let down'. Gardiner[78] passed the message on to the new Director, Dr Charles Tate Regan, who responded quickly. The post-war depression, which had prevented an earlier appointment, had eased and he was able to write on 13 August[79] to the Lords Commissioners of the Treasury: 'we promised to appoint an Assistant Keeper and now request funds to enable us to do so'. According to a letter from J. C. Murray to Seymour Sewell, such an appointment would hasten the transfer of the *Mabahiss* collections from Cambridge to the Museum. A month later, on 18 September,[80] the Secretary of the

Treasury authorized the appointment of the new Assistant Keeper to curate the Oceanographical Collection and the post was advertised in *The Times* and *Nature* on 4 and 6 October 1934, respectively. Originally intended as a Department of Zoology appointment, Trustees now felt it more appropriate to the Department of Mineralogy and proposed to transfer the collection accordingly.

The collection was housed in Block B and from 1927 onwards, following the initiation of the Discovery Committee (Deacon, 1984, and p. 88), on which the Museum was represented, it shared the building with the Whale Research Unit of the Discovery Investigations until it was moved for safety in 1940 to the centre of the Museum's basement. Accordingly, Block B became known as the 'Discovery Hut' or 'Discovery Building' (Plate 9). A galvanized iron and wood temporary building, acquired from the Office of Works in 1921, it strongly resembles in many ways the Discovery House, another specially designed prefabricated building erected in Grytviken, South Georgia (Plate 16) in January–February 1925. Both buildings still stand; Block B is situated at the northwest rear of the Museum and measures some 38 × 18 m. These dimensions suggest a rather larger area (over 653 m^2) than the 437 m^2 stated by the Office of Works. The black and white painted hut has transverse gabling, indicating its sections. This distinguishes it from the longitudinally gabled but otherwise similar buildings which lie in line westwards (Block D) and across the roadway to the northwest (Block A). These are of interest; now belonging to the Royal College of Art, they are rumoured to be very similar in design to the experimental prefabricated modular field hospital buildings designed by I. K. Brunel for Florence Nightingale that were set up at Scutari in Turkey in 1855, only to be sold off *in situ* the following year when the Crimean War ended.

No immediate appointment followed the 1934 advertisement, but Professor Gardiner wrote[81] from Cambridge to the Director on 11 March 1935 to say that Dr John Dugdale Holt Wiseman (1907–) would be examining the clay minerals in the *Mabahiss* material in the Department of Mineralogy and Petrology there: 'sub-aqueous questions of very great importance . . . work that is entirely new and a distinct advance'. Wiseman was a petrologist who gained his Cambridge doctorate with a thesis on the epidiorites of the central and southwest Highlands of Scotland. He subsequently applied for the post and was appointed Assistant Keeper on 1 October 1936.

In November 1935 the Murray Collection was transferred from the Department of Zoology to the Department of Mineralogy: this was reported to Trustees by the Keeper of Mineralogy, Dr G. F. Herbert Smith, on 18 November.[82] Some of it went later to the Department of Palaeontology, whilst the island rocks and phosphates had previously been detached from the main collection and presented to the Department of Mineralogy in November 1921. The collection was housed in war surplus cupboards, which were dusty and dirty and needed dustproofing. The concern of the Murray family was perhaps justified; although labelled, the collection was somewhat ill-housed. Accordingly, a newly appointed Assistant Keeper, Dr G. F. Claringbull, who joined the Museum on 1 October 1935 and was later to become Keeper of Mineralogy and, as Sir Frank Claringbull, Director of the Museum, was delegated on 18 November to 'work through, put in order and clean up, but not to work on, the *Challenger* collection'. He should do no research on the collection, in case the new Assistant Keeper should 'be possessed of peculiar qualifications for that work'.[83] The Director, Dr Regan, wrote on 28 November to Dr Bernard Smith, FRS, Director of the Geological Survey of Great Britain next door in Exhibition Road, suggesting that they should present the British Museum with their collection of deep-sea deposits from the Bahamas. If he agreed – which he did not – the Keeper of Mineralogy would be in touch with him.

Late in June 1936, at Col. Sewell's suggestion, Dr F. A. Bannister, Cambridge physicist and by now crystallographer in the Department of Mineralogy in the British Museum (Natural History), treated the *Mabahiss* cores with vinyl acetate in Cambridge as a preservative measure.[84] On 1 October J. D. H. Wiseman took up his appointment[85] and on 10 April 1937[86] Dr Herbert Smith wrote to the Director concerning the setting up of an 'Oceanographical Room', in an area formerly used by Heron-Allen and adjoining the chemical laboratory. He followed this on 17 April[87] with a memorandum to Trustees, reporting that Wiseman had

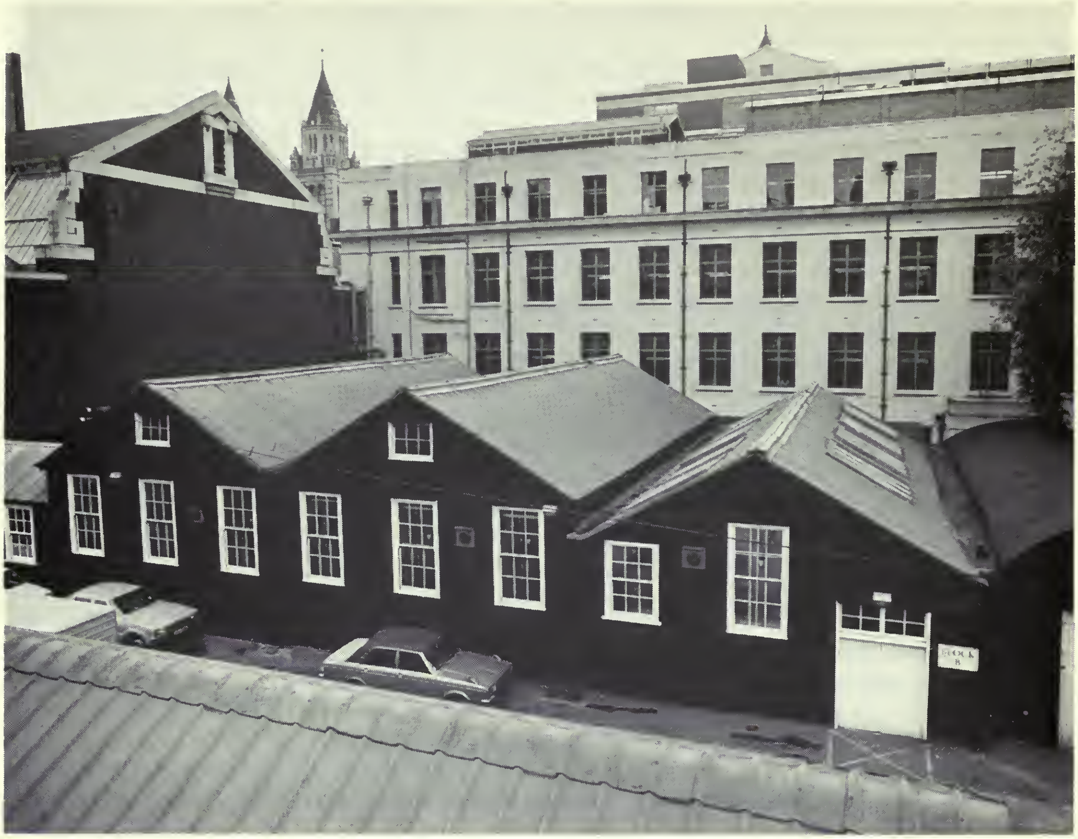


Plate 9 The Discovery Hut or Block B, showing the three main units of the building. In the left background is the west-central tower of the main Waterhouse Museum building. In the centre middle ground is the Department of Zoology Spirit Building, built between 1920 and 1930, and in the left centre the west end of the art deco Whale Hall, constructed between 1930 and 1934. The Entomology Block, begun in 1934 but, because of the war, not completed until 1952, is visible behind the Spirit Building.

returned to the Museum on 1 April from Cambridge, where he had spent the first six months of his Museum appointment, at Professor Gardiner's suggestion, working on the *Mabahiss* clays and, latterly, on the basaltic rocks dredged from the Carlsberg Ridge. The massive centrifuge, which had belonged to the Trustees of the Murray Collection, was presented by them to the Museum. It was transported to the Museum and set up in the store-room near to the Oceanographical Room. The starting gear had been damaged in transit between Manchester and Cambridge, so that there could be no trial. The instrument had been designed at the National Physical Laboratory as a new experimental type, to perform a wide variety of functions: in the event, it did none. Severe vibration resulting from the belt drive through high and low speed motors to the vertical spindle pulled the latter out of true. As a result, the centrifuge was never used and it was replaced in the 1960s by more modern instruments. It was finally dismantled in 1980 and presented to the Science Museum. At the end of November 1937, Wiseman[88–89] collected the cabinet of exceptionally interesting *Mabahiss* cores from Cambridge and the Oceanography Section within the Department of Mineralogy could be said to have become operational.

Wiseman's interests were wide-ranging. Primarily a petrologist, he became interested in oceanic basalts as a response to Professor C. E. Tilley's view that there was no need to look under the sea: the evolution of crystalline rocks need only be studied on land, where all the necessary evidence could be found. Certainly, the Geological Society was largely content to limit its fields of interest to the British Isles. His interests in oceanography extended far beyond igneous rocks, however, as suggested by his work on clays. Chemical analyses for carbon, nitrogen and the rock-forming oxides carried out at Imperial College, London, on the *Mabahiss* cores by Miss Hilda Bennett, funded by the Murray Trust, led Wiseman to deduce that Fe and Ti are deposited in sediments at a constant ratio (Wiseman & Bennett, 1940). This was followed by research on foraminifera and on problems of physical oceanography and submarine geomorphology.

Wiseman was awarded a John Murray Oceanographical Research Scholarship in 1935. The fund derived from the Murray Trust, whose trustees were persuaded in 1952 by Professor Hans Pettersson, at Cambridge, to pass its administration to the Royal Society, whose first award was to W. R. Riedel. Wiseman used his tenure as a Murray Scholar to examine rocks dredged from a depth of 340 m from the side of Providence Reef, a coral islet some 354 km NNE of Madagascar in the Indian Ocean. The rocks were dredged – a very inexpensive method of acquiring samples – by Sir Clive Forster-Cooper, Cambridge zoologist and later Director of the British Museum (Natural History), during the Percy Sladen Trust Expedition in HMS *Sealark* in 1905. Its leader, Professor J. Stanley Gardiner, sent samples to Sir John Flett, then Petrographer and later Director of the Geological Survey, for examination. Unfortunately, they were never looked at but Gardiner kept duplicates at Cambridge. These were sent to Wiseman; when he subsequently returned them to Cambridge they were mislaid by Albert Brighton, Curator of the Sedgwick Museum, who at the time was unwell. However, a thin-section survives and is in the British Museum collection. Wiseman (1936) found the rock to be a basaltic agglomerate, containing also Eocene-Oligocene foraminifera in a matrix of calcite. Analysis of the basalt fragments showed it to be limburgitic in nature. His work demonstrated that the Providence Reef had a volcanic formation of Tertiary age, the first time ocean-floor basement rocks older than Recent had been described, and therefore of great significance in the light of the Funafuti boring (see page 79).

In 1938, with the support of Vice-Admiral Sir John Edgell, Hydrographer of the Navy, Wiseman put up a proposal for the study of a small area of the Mid-Atlantic Ridge, analogous to the work of the John Murray Expedition on the Carlsberg Ridge, in the Indian Ocean. The Hydrographer was prepared to provide a ship and the project was to be in collaboration with the Department of Geodesy and Geophysics, University of Cambridge. Small bombs would be exploded at depth and used to measure times of travel of sound waves to buoys carrying hydrophones, anchored on taut wires. The arrival of the sound-waves would transmit signals to the ship, providing accurate depth contours. Dr W. Campbell Smith, Keeper of Mineralogy, also supported the idea and suggested the involvement of the Geological Society of London: it would thus be a joint British Museum (Natural History)–Cambridge-Geological Society expedition. Unfortunately, the signals of the approaching war put paid to the idea.

In the same year – 1938 – Wiseman attended the International Union of Geography meeting in Amsterdam – a conference dominated by Germany – where he was appointed by the Royal Geographical Society as International Rapporteur to the Oceanography Section. The following year he travelled to the USA, paying visits to Chicago, Harvard, the Woods Hole and Scripps Institutions of Oceanography and to Washington, where he presented a paper to the International Union of Geodesy and Geophysics.

The National Institute of Oceanography

Between the two World Wars, the British oceanographical effort centred on the Antarctic, conducted by the Discovery Committee around the area of the Falkland Islands Dependencies and mainly devoted to whale research. The current Keeper of Zoology at the Museum sat on the Royal Society British National Committee for Oceanic Research. Towards the end of the 1939–45 war, the Scientific Advisory Committee of the War Cabinet recommended to the Sub-

Committee for Oceanography of the British National Committee for Geodesy and Geophysics that a National Institute of Oceanography be established in Britain after the war, and an oceanographic expedition mounted. J. D. H. Wiseman, who had served on the Sub-Committee before the war, was seconded during the war to the Admiralty where he served in Queen Anne's Mansions as an Assistant Principal in CW (Commission and Warrant) II. On 16 February 1944[90] Admiral Edgell, the Hydrographer, wrote to him informing him of a meeting of the Sub-Committee to be held on 1 March to discuss the proposed post-war plans. Edgell had for some time regarded the Discovery Investigations Committee as being 'too biological' in its outlook, paying far too little attention to the sea-floor. Sent in fact to another 'Wiseman', the letter arrived after the event.[91] At the meeting, it was decided to recommend to the National Committee that a National Oceanographic Institute should be set up: the Sub-Committee's three pages of proposals were summarized by Dr G. E. R. Deacon.[92] Wiseman agreed to attend the next meeting, arranged for 26 May 1944, and survived the explosion of a flying bomb some 60 m from his work-place to do so.[93] As a result of the meeting, the Royal Society[94] charged a small sub-committee consisting of Professor J. Proudman, Professor G. R. Goldsbrough and Dr J. N. Carruthers with the task of making proposals for the establishment of the Institute of Physical Oceanography. Proposals were put forward by Lieut.-Com. J. R. Lumby, RN,[95] on which Wiseman commented in a letter to Carruthers dated 21 June 1944,[93] and on 5 July[96] a précis was compiled giving the opinions held by various concerned people on Lumby's proposals.

Throughout that summer, memoranda were circulated by Carruthers and Admiral Edgell inviting comments and suggestions on the proposals and draft final report, including Wiseman's hope that 'adequate attention [would be paid] to marine biology and marine geology'.[97] He also commented on the large size of the governing body and suggested that a Council be set up. Wiseman was listed as a member of the Sub-Committee whilst still working at CW II and later, after the war, was duly notified on 24 November 1947[98] of a meeting to be held in the Royal Society on 3 December to consider the list of co-opted members, which differed slightly from the 1944 list. The Minutes[99] of this meeting ratified final membership of the Sub-Committee.

Pending the grant of a Royal Charter for a National Oceanographic Council, the Sub-Committee led to the formation on 1 April 1949, under a provisional Executive Committee appointed by the Admiralty, of the new National Institute of Oceanography; the Committee was chaired by Sir Frederick Brundrett. Dr G. E. R. Deacon was appointed Director and Captain (S) R. H. G. Franklin, RN, Secretary. The Royal Charter was sealed on 15 December 1950 and a larger Council under the Chairmanship of the Civil Lord of the Admiralty, W. J. Edwards, replaced the provisional Executive Committee. Dr N. A. Mackintosh was now appointed Deputy Director. Wiseman joined the Council in 1956–57, on the recommendation of the President of the Geological Society, Professor Leonard Hawkes, FRS, and served until 1962–63.

Until suitable premises could be acquired, the units of the NIO were housed in the London area – with Dr Mackintosh's Whale Research Unit and the Discovery Collections in the care of Dr H. E. Bargmann at the British Museum (Natural History) – and also at Plymouth and in Cornwall. The Whale Research Unit was transferred in March 1977 to the Sea Mammals Research Unit, British Antarctic Survey, Cambridge, after 50 years at South Kensington. Although Wiseman would have liked the NIO to have been established on the land at the rear of the Museum, negotiations were instituted to lease from the Admiralty buildings erected in 1943 as an extension of the Signal and Radar Research Establishment at Haslemere. These premises were in Brook Road, Wormley, near Godalming, in Surrey. Although some 50 km from the sea this choice was governed chiefly by factors such as size, suitability and availability. Staff and equipment were moved in between late 1952 and February 1953, in which latter year Dr J. N. Carruthers was seconded from the Admiralty and appointed Assistant Director. Thus the National Institute of Oceanography came into being, under the initial directorship, until 1971, of Sir George Deacon, and later – in 1973 – to change its name to the Institute of Oceanographic Sciences, one of the research institutes of the recently formed Natural Environment Research Council. A fitting tail-piece tells how, during the reception to open the *Challenger* Exhibition at the British Museum (Natural History) on 27 February 1973, a conversation took place around the photographs of HMS *Challenger*'s figurehead, which were included in the exhibition. The figurehead stood at that time in the front garden of the office of the Commander-in-Chief, Fleet, at Northwood, north London. Then and there it was agreed to present it to IOS where, newly refurbished in resplendent colours, it was ceremonially unveiled on 22 June of the same year (Plates 10–11).

Post-war Developments

J. D. H. Wiseman returned to the Museum on 20 May 1946, having been promoted in his absence as well as being appointed to the Sub-Committee to promote the establishment of the National Institute of Oceanography. Immediately before the war, his research interests had lain in several directions. Firstly, he worked on the clays and igneous rocks cored and dredged by the *Mabahiss* on the John Murray Expedition of 1933–34. Secondly, he became interested in foraminifera and other planktonic protozoa, as well as in physical oceanography. His last job with the Admiralty, before being released, was to visit the British Zone of Germany on an intelligence mission to ascertain the state of their oceanographic institutions (Wiseman, 1946). Wiseman visited three major and three minor establishments: the former were in Göttingen, under Professor C. W. Correns; Hamburg, under Professor O. Pratje; and Kiel, under Professor G. Wüst – the Berlin Meereskunde had been destroyed. Before the war, research work arising from the cruises of the *Meteor*, among others, had helped the Germans to lead the field and, as well as gaining information, charts and literature, Wiseman was there to help them re-establish their scientific effort. In 1948 he visited Oslo to re-establish contacts with American oceanographers and others at a meeting of the International Union of Geodesy and Geophysics.

Wiseman supervised the expansion of the Museum's Oceanography Section and the transfer of the collection in 1951 from its cramped wartime quarters in the basement into cupboards acquired as war surplus from the War Office. These had been stored in St James's Park and were placed in the 'War Room', a concrete sub-surface labyrinth constructed in the Museum's east gardens as a wartime headquarters of the Civil Defence (Plate 12). He continued his work on foraminifera with Dr C. D. Ovey and others; among the latter was Dr W. R. Riedel, specialist in siliceous microplankton. His recruitment by the Museum was suggested, but came to nothing; much later, in 1968, he became the Curator of the Deep Sea Drilling Project at Scripps Institution of Oceanography, La Jolla, California. Mr H. A. Buckley, who joined the Section in 1961, became interested in foraminiferal research and succeeded Ovey and Riedel as Wiseman's collaborator. Wiseman's collaborative work extended to material collected by the Swedish Deep-Sea Expedition of 1947–48 in the *Albatross*, on which he worked with Ovey, Professor Hans Pettersson (the leader), Dr Gustav Arrhenius, Dr B. Kullenberg, Dr R. W. Kolbe and others.

In 1952 the Director, Sir Gavin (R.) de Beer, asked Wiseman to assist the Swiss hydrobiologist, Professor Otto Jaag, who was studying pollution in Lake Zurich. Wiseman used the new Kullenberg-type piston corer to obtain sediment samples through the central hole ('moon-pool') in a barge. The results, based on the frequency of the black anoxic layers containing the diatoms and algae which caused the pollution, indicated that the fouling occurred only during the summer months, since approximately 1900.

Wiseman attended meetings of the International Union of Geodesy, the Marine Biological Association at Plymouth, of which he was a Council member, and many other conferences. As well as the National Oceanographic and MBA councils, he served once more on the Physical Oceanography Sub-Committee of the BNC for Geodesy and Geophysics, the INQUA Commission and Sub-commissions for Deep-Sea Sediments, the Lithology and Genesis of Quaternary Deposits, and their Absolute Age. He also sat on the Geological Society Marine Studies Group Committee, the NERC Committee on Ocean Floor Sampling, and – in 1971 – the Royal Society of Edinburgh Sub-Committee for the *Challenger* Celebrations of 1972. He

Plate 10 HMS *Challenger*'s figurehead at Northwood, in the garden of the office of the Commander-in-Chief, Fleet.

collaborated in the planning of the Museum's *Challenger* Exhibition, at which Murray's unmarried daughter was present. He was on the editorial board of *Deep-Sea Research* from its inception in 1953 until 1973 and, with Ovey, published papers in Volumes *1*, *2* and *3*.

During his time at the Admiralty, Wiseman had developed a strong link with the Hydrographer of the Navy and his department. As a result, an arrangement was set up whereby every tenth sounding sample taken by Royal Naval Survey ships was sent to the Museum. This coverage – at first world-wide – greatly enhanced the collection and it still does, although of recent years economic constraints have led to a restriction on the activities of the ships, with a greater emphasis on home waters. Deep-draught oil tankers have also necessitated the re-surveying of the English Channel and its approach waters to a very great degree of accuracy. Under a succession of Hydrographers – Rear-Admirals E. G. Irving, G. S. Ritchie, G. P. D. Hall, D. W. Haslam and R. O. Morris – a very substantial collection of

Plate 11 HMS *Challenger*'s figurehead, now at the Institute of Oceanographic Sciences, Wormley, Godalming, Surrey.

sounding samples, taken by Shipek grab, underway sampler and various other methods has been built up. Links with oceanographic institutions throughout the world, especially in the USA, led to further expansion of the collection.

Wiseman was promoted to Principal Scientific Officer on 1 May 1950 and in October and November 1956 was granted special leave to participate in Survey ship cruises. The highlight of

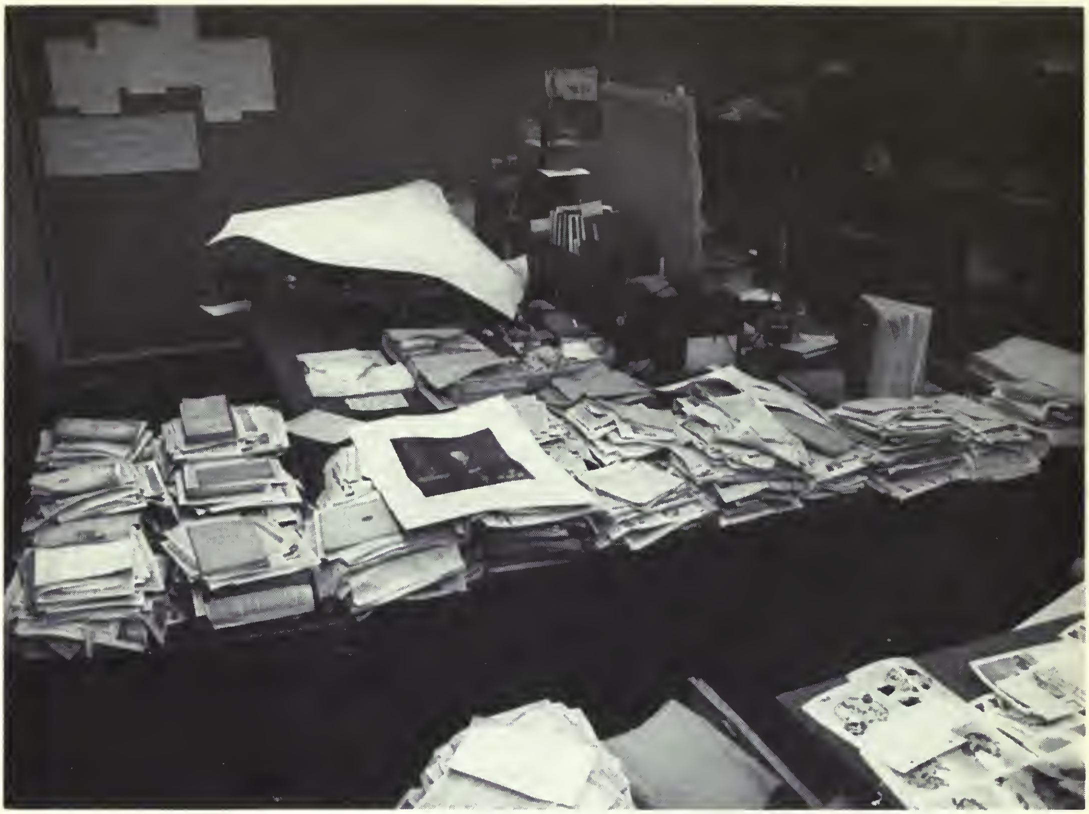


Plate 12 The 'War Room' in 1966, just after a severe flood had damaged some of the labels on the glass jars; the contents were unharmed.

this phase was a cruise in HMS *Owen* in 1960–61 (Plate 13), with Commander Hall, later Hydrographer, which yielded a valuable collection of cores and included the fourth recorded landing – after those of Charles Darwin in the *Beagle*, the *Challenger* scientists and Dr G. Vibert Douglas in the *Quest* – on St Peter and Paul Rocks, South Atlantic Ocean. Wiseman's other interests included manganese nodules, cosmic spherules and aeolian dusts; he became Deputy Keeper of Mineralogy on 1 December 1968 and retired in September 1972 (Plate 14).

Dr D. R. C. Kempe joined the Section in 1970, when the collection and research laboratories moved to an out-station at North Acton. This became necessary when the New East Wing, to house the Department of Palaeontology, was built on to the Museum. Unsuccessful attempts were made to demolish the 'War Room', in the middle of the site, by explosives, and it was integrated into the new wing as a sub-basement. The first British Museum (Natural History)-NERC Joint Institute Research Student, A. J. Fleet, came to the Section in 1972, working jointly with Dr P. Henderson, then at Chelsea College, University of London, on sediments collected by Kempe on Leg 26 of the Deep Sea Drilling Project. During the Acton period, Westward TV filmed some of the *Challenger* manganese nodules on 18 October 1977 for the film *The Selling of the Sea*; shortly afterwards, in early 1980, the building at Acton was vacated and the collection moved to a new, larger out-station at South Ruislip.

In the late 1970s, it was decided to change the name of the Section to Oceanic Petrology, to encompass the Ocean Bottom Deposits Collection. A second NERC research student joined the group in collaboration with Imperial College, University of London, and Dr Kempe served as Chairman of the Geological Society Marine Studies Group and of the UK IPOD Ocean Crust Panel.

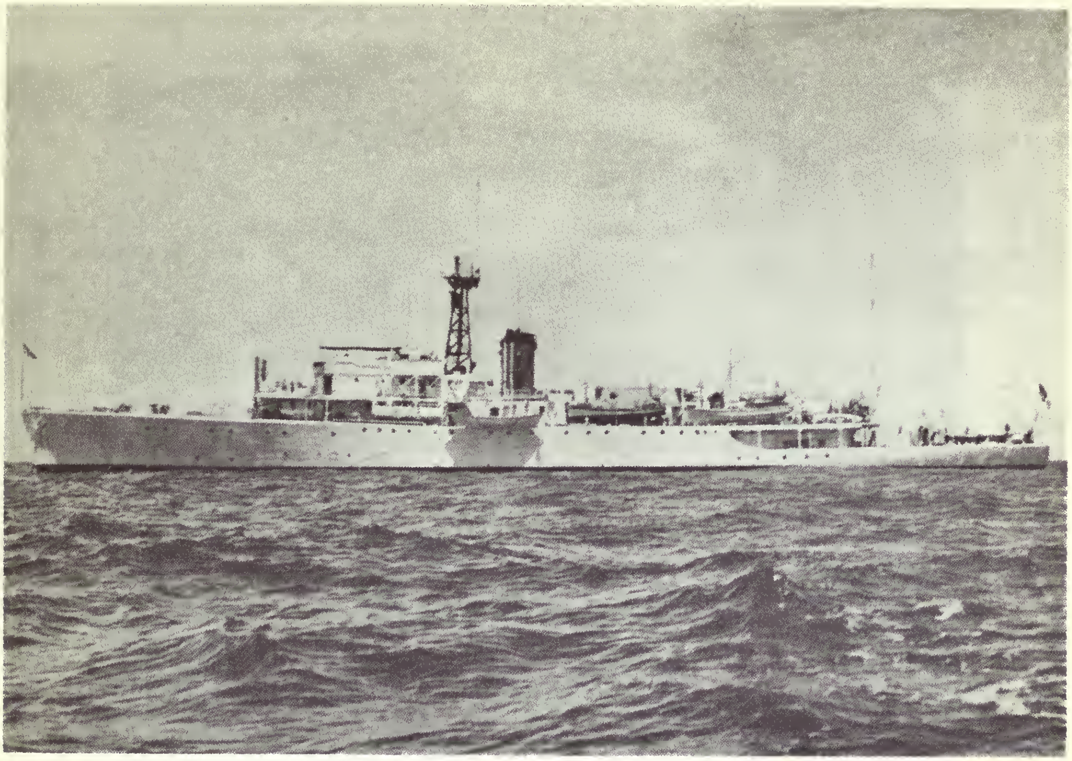


Plate 13 HMS *Owen.*

The Ocean Bottom Deposits Collection

The size of the collection has been recently assessed at approximately 25 000 specimens. It was based on the John Murray collection of 9746 sounding samples, used as the basis for Murray's deep-sea deposits map of the world. There are also the manganese nodules, dredged for the first time from the deep ocean and thought, before analysis, to be lumps of pitch. The rock samples, collected mainly from oceanic islands, including St Peter and Paul Rocks, also contain basalt from the Mid-Atlantic Ridge (MAR) and pumice and other fragments of acid rocks dredged from the Pacific Ocean. The *Challenger* soundings from the MAR virtually delineated the ridge, although at the time it was recorded merely as a submarine mountain. Some large dredged boulders are included in the collection. Amongst these are a piece of basalt from the Discovery Tablemount weighing more than 5 kg (Buckley, 1976; Kempe, 1973; Kempe & Schilling, 1974); a boulder of porphyritic olivine basalt from near the Balleny Islands weighing 37 kg; and two boulders of greywacke from the Bay of Whales registering 40 and 21 kg (Kempe, 1973).

Possibly the first deep-sea sediment samples to be collected and retained are represented in the collection; taken in 1844 by the US Coast Survey Brig *Washington*, they came from the east coast of the USA. The first Mid-Atlantic Ridge basalt to be described is represented by a thin-section only: the rock had disappeared, possibly in Cambridge or in Switzerland, and so was never presented to the Museum. It was accidentally 'grappled' by the cable ship *Faraday* in 1874, and described in the first paper in the newly-launched *Mineralogical Magazine* (Hall, 1876). Between 1896 and 1898 the Royal Society mounted a series of drilling expeditions to Funafuti, an atoll in Tuvalu (formerly the Ellice Islands), in the western Pacific Ocean. Their aim was to test Darwin's hypothesis that coral islands grew upwards on subsiding volcanic

Plate 14 Dr John D. H. Wiseman in 1969.

islands or seamounts. Sir John Murray, incidentally, thought that coral atolls developed outwards on rising shoals or shallow banks of volcanic origin, thus keeping below the water surface. He never voiced this opinion openly, however, in view of the eminence of the other current protagonist in the argument. Although basalt was never reached, cores totalling 340 m in depth were obtained and subsequently sliced longitudinally. One half is in the Museum's collection, the other half in the Australian Museum in Sydney. The point was finally resolved in 1950 when a boring at Eniwetok, another Pacific atoll used to test the first hydrogen bomb, reached basalt at a depth of 1353 m: a sample of this rock is in the collection. The Niue Island core from the south Pacific, described by Rodgers *et al.* (1982), is also represented in the collection. Of interest, too, are the drums of sea-water from the Southern Ocean, collected by the British Antarctic Survey after the atom bomb explosions but before the hydrogen bomb.

Early collections were registered under 'Expeditions'. To rationalize this and to make the location of specimens infinitely easier and quicker, a Marsden square grid system was devised whereby samples are arranged by 10° latitude bands, away from the Equator, and then by 10° squares, from west to east. The collection is curated by H. A. Buckley and contains some 25000 oceanic rocks, cores and rod samples – notably the *Mabahiss* and *Owen* cores – and the Royal Navy and other sediments; all are recorded in the two-part catalogue of Buckley *et al.* (1979 and 1984).

Rock and Mineral Research

John Wiseman's work on the igneous rocks dredged during the John Murray Expedition from the Carlsberg Ridge, north-western Indian Ocean, resulted in his characterization of ocean-floor basalt some 30 years before the serious study of ocean-floor rocks began and the basalt was recognized as a ubiquitous oceanic rock type, hardly resembling the Deccan Trap basalts as had been expected. He wrote two papers on ocean tholeiite, or MORB (mid-ocean ridge basalt) as it is now known, with its low K_2O and high H_2O content and Fe_2O_3/FeO ratio (Wiseman, 1937; Wiseman & Sewell, 1937). In the latter, using topographical data, Wiseman and Sewell were able also to demonstrate the close resemblance between the ridges of the Arabian Sea and the East African rift system: a fundamental conceptual connection that much later came to be appreciated. Wiseman also collaborated in a paper on the chemistry of sediments from the Arabian Sea (Wiseman & Bennett, 1940).

Wiseman's second major interest had now become a study of the temperature-related fluctuations in the tests of planktonic foraminifera and, later, coccoliths. He demonstrated that the Pleistocene climatic variations in the North Atlantic could be determined from variations in the oxygen isotopic composition of certain foraminiferal shells. This work was coupled with a general interest in physical oceanography, resulting in a series of papers, many in collaboration with Dr C. D. Ovey, a zoologist in the Museum, both before and after the war, and later with H. A. Buckley. Papers in these areas in fact account for the bulk of Wiseman's 30 or so more important contributions, including those written when he was Chairman of the International Committee on the Nomenclature of Ocean Bottom Features, charged with the study of the rules of their definition (Wiseman & Ovey, 1950; Wiseman, 1953; Wiseman & Hendey, 1953; Wiseman & Ovey, 1953; Wiseman, 1954; Wiseman & Ovey, 1954; Wiseman & Ovey, 1955*a* and *b*; Herdman *et al.*, 1956; Wiseman & Hall, 1956; Wiseman, 1959; Wiseman, 1964; Wiseman, 1965*a*, *b* and *c*; Wiseman, 1966*a*; Shackleton *et al.*, 1973).

Another field in which Wiseman made a substantial contribution to oceanography resulted from his visit in HMS *Owen* to St Peter and Paul Rocks. Close examination of these fragments of mylonitized ultramafic mantle rocks, raised tectonically to the surface of the ocean, revealed the presence of two or even three distinct secondary amphibole phases, resulting in several different rock types (Wiseman, 1966*b*). He maintained his work on foraminifera and climatic variations, however, working still with H. A. Buckley and Dr N. J. Shackleton, at Cambridge. Unfortunately, circumstances prevented him from accepting an invitation in 1968 from JOIDES to act as co-chief scientist, with Dr W. Maurice Ewing, on Leg 1 of the newly instituted Deep Sea Drilling Project.

Between 1966 and 1968 Dr J. R. Cann worked in the Section on oceanic eruptive igneous rocks (Cann, 1968). Kempe, and also Dr L. R. Johnson, who joined the group in 1971, participated in research cruises; Kempe crossed the Atlantic in the Canadian research ship *Hudson* in 1971, becoming involved in drilling the Mid-Atlantic Ridge basalts using the Brooke-Bedford Institute deep-sea ambient pressure drill. The following year he participated in Leg 26 of the Deep Sea Drilling Project as petrologist and sedimentologist, crossing the Indian Ocean in the DV *Glomar Challenger* from Durban to Fremantle (Plate 15). In the same

Plate 15 DV *Glomar Challenger*.

year, 1972, Johnson took part in the Mediterranean Sea cruise of RRS *Shackleton*, collecting several cores from near Cyprus. Several research projects resulted from these activities. Kempe described the basalts from several sites drilled in the Indian Ocean and noted and described a very rare occurrence of metasomatic hydrogarnets in the baked nannoplankton ooze overlying the basalt (Kempe & Easton, 1974; Easton *et al.*, 1977). Dr A. J. Fleet successfully completed his thesis on the sediments from DSDP Leg 26 and published some of his results in Fleet & Kempe (1974), Fleet *et al.* (1976) and Fleet & McKelvey (1978). Kempe went on to contribute papers on the petrology and mineralogy of basalts from Legs 34 and 37 of the DSDP (Kempe, 1975), as did Dr A. L. Graham on Leg 45.

The Discovery Tablemount (or Discovery Bank) was first located in May 1936 during the *Discovery* investigations. A large boulder of basalt was dredged, probably at the suggestion of J. W. S. Marr, and both tablemount and basalt were first described in detail some 40 years later. Buckley (1976) gave a detailed account of the morphology of this small tablemount chain, while Kempe & Schilling (1974) discussed the petrology and mineralogy of the basalt, showing its possible origin as a manifestation of a mantle hot spot. Johnson collaborated with Buckley on an account of the Cyprus cores and their significance (Buckley *et al.*, 1982) and published a number of papers on aeolian dusts and oceanic clay mineralogy (Johnson, 1979; Buckley *et al.*, 1974). Rodgers *et al.* (1982) described the chemistry and dolomitization of the Niue core and some work has been carried out on the Funafuti material.

There has been comparatively little research on minerals. Nevertheless, Bannister & Hey (1936) described weddellite (calcium oxalate, $CaC_2O_4. (2 + x)H_2O$) and earlandite (calcium citrate, $Ca_3 (C_6H_5O_7)_2. 4H_2O$), collected with gypsum from the Weddell Sea during the Scottish National Antarctic Expedition of 1902–4 in the *Scotia* and picked out by Arthur Earland whilst sorting foraminifera. The metasomatic garnets from the Indian Ocean have already been mentioned, and recent mineralogical research continued with a definitive paper distinguishing between celadonite and glauconite (Buckley *et al.*, 1978), one on variations within glauconite grains (Buckley *et al.*, 1984) and another discussing their rare earth element contents (Fleet *et al.*, 1980).

To summarize, the numbers of papers on oceanographic topics published by members of the Section quinquennially from 1926 to the present are: 1930: 2; 1935: 1; 1940: 3; 1945: nil (war years); 1950: 6; 1955: 16; 1960: 6; 1965: 7; 1970: 3; 1975: 22; 1980: 22 and 1985: 7 – total 95.

Acknowledgements

Many thanks are due to Dr C. G. Adams, Mr R. E. R. Banks, Dr A. C. Bishop, Mrs E. V. Brunton, the late Sir George Deacon, Miss Margaret Deacon (Mrs M. B. Seward), Mr D. T. Moore, Miss D. M. Norman, Dr J. G. Sheals, Dr J. E. Whittaker, Dr A. R. Woolley and – especially – Dr A. L. Rice and Dr J. D. H. Wiseman, for their help and critical comments on various aspects of the manuscript. The staff of the Photographic Unit are also sincerely thanked.

Appendix

The Antarctic Expeditions

It seems appropriate to conclude this account by summarizing the expeditions to the Southern Ocean in which Britain and the countries now in the Commonwealth were the sole or major participants. For, as already stated, the biological and geological collections formed during all but the earliest of them were in most cases subsequently presented to the Museum; the exceptions were generally those in which only limited material was accumulated and subsequently considered to be of no great importance. For this section, very considerable use has been made of the compilation of Dater (1975).

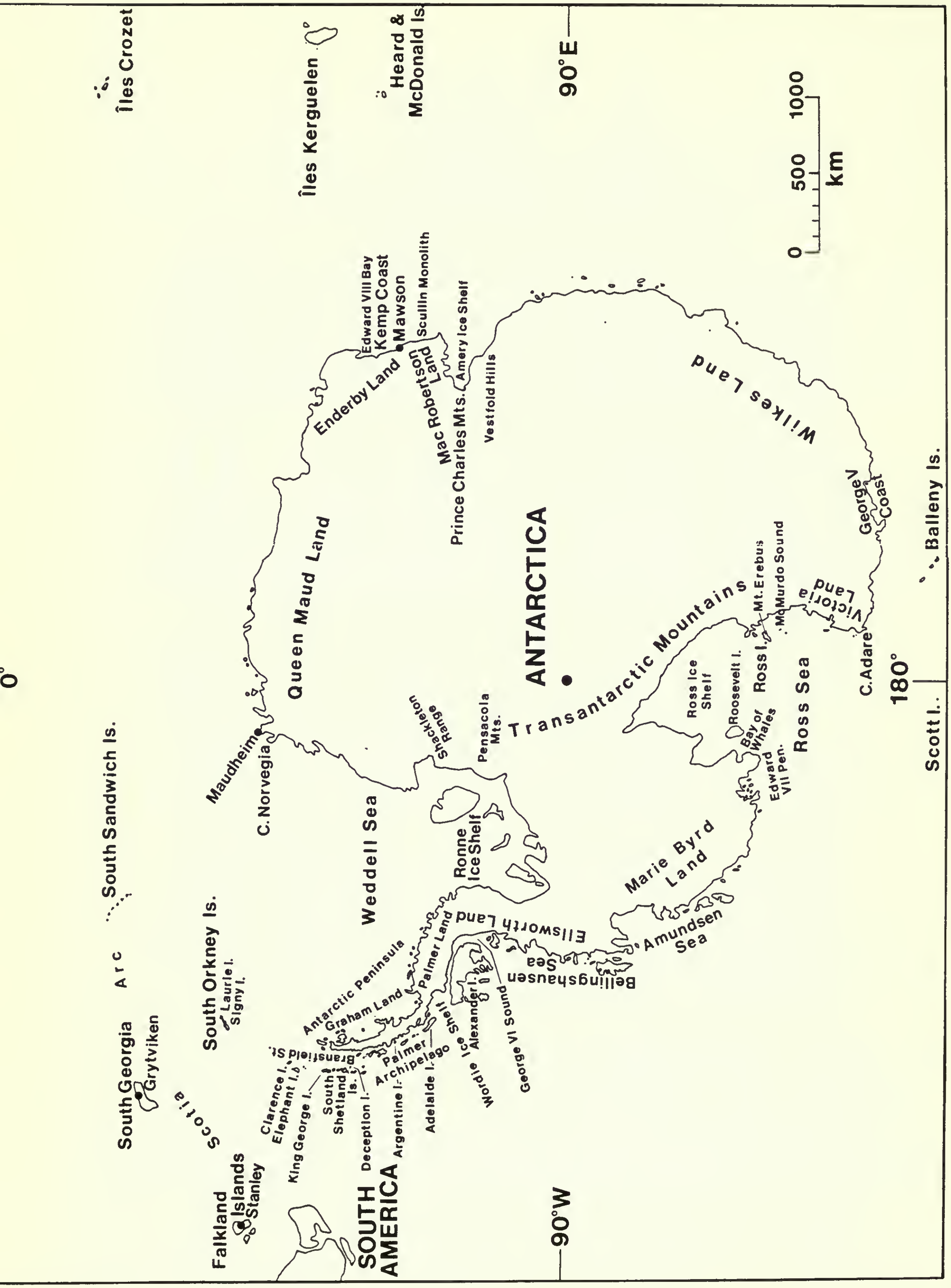
The first Antarctic Expedition (Plate 16 and Table 1) was that of Captain James Cook, leading the *Resolution* and *Adventure* between 1772 and 1775. This was his second southern voyage of discovery and exploration, during which Cook sensed the presence of land near the

Table 1 Antarctic Expeditions with British or Commonwealth Involvement.

Dates	Country – and name	Leader(s)	Ship(s) Aircraft [A]	Purpose	Principal area(s)	Material collected (if any) in the British Museum (Natural History)
1772–1775	Great Britain	Captain James Cook	*Resolution*; *Adventure*	discovery & exploration	South Georgia; South Sandwich Islands	–
1819	Great Britain	Captain William Smith	*Williams*	commercial & cargo	South Shetland Islands	–
1819–1820	Great Britain	SM Edward Bransfield, RN	*Williams*	seek new lands for England	Elephant & Clarence Islands	–
1820–1822	Great Britain	Captain George Powell	*Dove*	sealing	South Orkney Islands	–
1822–1824	Great Britain	Captains James Weddell & Matthew Brisbane	*Jane*; *Beaufoy*	sealing	Weddell Sea	–
1828–1831	Great Britain	Captain Henry Foster, RN	*Chanticleer*	scientific investigation	Deception Island	rocks
1830–1832	Great Britain	Captain John Biscoe	*Tula*; *Lively*	sealing & exploration	Graham Land	–
1833–1834	Great Britain	Captain Peter Kemp	*Magnet*	sealing & exploration	sighted Kemp Coast	–
1838–1839	Great Britain	Captain John Balleny	*Eliza Scott*; *Sabrina*	sealing & exploration	Balleny Islands	–
1839–1843	Great Britain	Captain James Clark Ross, RN	*Erebus*; *Terror*	exploration; magnetic & scientific studies	Graham Land; many islands	many rocks; stomach pebbles; plants
1872–1876	Great Britain	Captain George S. Nares, RN & Prof. C. Wyville Thomson	*Challenger*	oceanographic studies	wide & various	many dredged rocks & sediments; stomach pebbles; animals; plants
1892–1893	Scotland	Captain Alexander Fairweather & three others	*Balaena*; *Active*; *Diana*; *Polar Star*	whaling reconnaissance	coastal observation	–
1898–1900	Great Britain	C. E. Borchgrevink	*Southern Cross*	magnetic & meteorological studies	Victoria Land	many rocks
1901–1904	Great Britain – National Antarctic Expedition	Captain Robert F. Scott, RN	*Discovery*; later *Morning*; *Terra Nova*	attempt to reach South Pole	Antarctic continent	many land & dredged rocks
1902–1904	Scotland – Scottish National Antarctic Expedition	Dr William S. Bruce	*Scotia*	scientific investigation	Weddell Sea	–
1907–1909	Great Britain – British Antarctic Expedition	Lieut. Ernest Shackleton, RNR	*Nimrod*	attempt to reach South Poles; scientific research	Antarctic continent	many rocks
1910–1913	Great Britain	Captain Robert F. Scott, RN	*Terra Nova*	attempt to reach South Pole; scientific work in Ross Sea	Antarctic continent; south Victoria Land; Ross Sea	many rocks (historically famous)
1911–1914	Australia & Great Britain – Australasian Antarctic Expedition	Sir Douglas Mawson	*Aurora*	scientific & geographical research	Wilkes Land	rocks
1913–1914	Scotland	(T. Salvesen)	*Hanka*	whaling prospecting	South Shetland Islands; Palmer Archipelago; Graham Land	rocks collected by David Ferguson

1914–1916	Great Britain – British Imperial Trans-Antarctic Expedition	Sir Ernest Shackleton	*Endurance*; *Aurora*	transcontinental exploration	Antarctic continent	few specimens collected
1920–1922	Great Britain	J. L. Cope	various whaling ships	to map coastline of Weddell Sea	Weddell Sea	–
1921–1922	Great Britain	Sir Ernest Shackleton	*Quest*	exploration & mapping	Antarctic continent	rocks
1925–1939	Great Britain – Discovery Investigations	Drs N. A. Mackintosh, Stanley Kemp, D. Dilwyn John, G. E. R. Deacon, H. F. P. Herdman & G. W. Rayner	*Discovery*; *Discovery II*; *William Scoresby*	whale & oceanographical research	wide & various	many land & dredged rocks
1928–1930	USA & Great Britain	Sir Hubert Wilkins	*Hektoria*; *William Scoresby*; [A]	transatlantic flight reconnaissance	various	–
1928–1930	USA – 1st Byrd Antarctic Expedition	Rear-Admiral Richard E. Byrd, USN (Retd)	*City of New York*; *Eleanor Bolling*; [A]	exploration & scientific investigation	various	rocks collected by L. M. Gould
1929–1931	Great Britain, Australia & New Zealand – British-Australian-New Zealand Antarctic Research Expedition (BANZARE)	Sir Douglas Mawson	*Discovery*; [A]	scientific & geographical investigation	Antarctic continent & islands	rocks
1934–1937	Great Britain – British Graham Land Expedition	John Rymill	*Penola*; [A]	scientific investigations & surveying	Graham Land	rocks
1943–1955	Great Britain – Operation Tabarin & Falkland Islands Dependencies Survey	Lieut. Com. J. W. S. Marr & others	*William Scoresby*; *Fitzroy*; *Eagle*; *Trepassey*; *John Biscoe*	long-range scientific & surveying programme, & territorial claim	various	–
1946–1947	Great Britain	Captain Reider Pedersen & John Grierson	*Balaena*; [A]	whaling & whale reconnaissance, & scientific studies	various	–
1949–1952	Norway, Great Britain & Sweden – Norwegian-British-Swedish Antarctic Expedition	Captain John Giaever	*Norsel*; [A]	scientific research & surveying	various	–
1954–1955	Australia – Australian National Antarctic Research Expedition	Phillip G. Law	*Kista Dan*; [A] (following the *Wyatt Earp*, 1947–1948)	scientific investigation & geographical exploration	various	–
1957–1958	Commonwealth Transantarctic Expedition	Sir Vivian Fuchs	–	transantarctic crossing	Antarctic continent	rocks

Data from Dater (1975).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Îles Kerguelen
Heard & McDonald Is.
South Sandwich Is.
Arc
Scotia
South Georgia
Grytviken
South Orkney Is.
Laurie I.
Signy I.
Falkland Islands
Stanley
SOUTH AMERICA
Clarence I.
Elephant I.
King George I.
South Shetland Is.
Deception I.
Bransfield St.
Argentine I.
Palmer Archipelago
Adelaide I.
Wordie Ice Shelf
Alexander I.
George VI Sound
Antarctic Peninsula
Graham Land
Palmer Land
Ellsworth Land
Bellingshausen Sea
Amundsen Sea
Marie Byrd Land
Weddell Sea
Ronne Ice Shelf
Maudheim
C. Norvegia
Queen Maud Land
Shackleton Range
Pensacola Mts.
Transantarctic Mountains
ANTARCTICA
Enderby Land
Edward VIII Bay
Kemp Coast
Mawson
Scullin Monolith
Mac Robertson Land
Prince Charles Mts.
Amery Ice Shelf
Vestfold Hills
Wilkes Land
George V Coast
Balleny Is.
Victoria Land
Mt. Erebus
McMurdo Sound
Ross I.
Roosevelt I.
Ross Ice Shelf
Bay of Whales
Edward VII Pen.
Ross Sea
C. Adare
Scott I.

Plate 16 The Antarctic, showing the principal localities visited by the expeditions.

South Pole and made the first landing on South Georgia; he also discovered the southern South Sandwich Islands. In 1819 Captain William Smith, on a commercial cargo voyage in the *Williams*, was blown off course and discovered the South Shetland Islands. Admiralty Sailing Master Edward Bransfield followed, in the same ship, and in 1820 went from the South Shetlands to Trinity Land and on to Elephant and Clarence Islands. Many British, American and other ships now visited the area, amongst them Captain George Powell in the *Dove*, who on his 1820–22 sealing cruise claimed the South Orkney Islands for Great Britain. Seal hunting took Captains James Weddell and Matthew Brisbane, in the *Jane* and *Beaufoy*, to the Antarctic in 1822–24, whilst scientific investigation led Captain Henry Foster, RN, in the *Chanticleer* to follow in 1828–31. Rocks collected by Foster's expedition from Deception Island, and briefly described by Surgeon W. H. B. Webster, RN, are in the Museum's collections (Campbell Smith & Game, 1954: 167–8). Sealing and exploration were the motives for Captain John Biscoe in the *Tula* and *Lively*, and Captain Peter Kemp, in the *Magnet*; Biscoe annexed Graham Land – now the Antarctic Peninsula – in the name of the British Crown. Captain John Balleny, again sealing and exploring, charted the islands named after him – the Balleny Islands – in the *Eliza Scott* and *Sabrina* from 1838 to 1839.

True scientific exploration, sponsored by the Admiralty and the Royal Society, may be said to have begun on a large scale in the Antarctic with the voyage between 1839 and 1843 of the *Erebus* and *Terror*, led by Captain James Clark Ross, RN. Mainly aimed at co-ordinating magnetic observations, and reaching the South Magnetic Pole, the expedition achieved the most southerly penetration to date. It failed to reach the Pole but made countless magnetic and tidal observations and depth soundings. It also made extensive collections of lichens, mosses and marine life, as well as of igneous, sedimentary and metamorphic rocks from Graham Land, Kerguelen, the Auckland Islands, Campbell Island and islands off South Victoria Land. The collection included pebbles from the stomachs of seals and penguins and, although much of it was destroyed, part was successfully bequeathed to the Museum in 1890 by Deputy Inspector-General Robert M'Cormick, RN, who described the geology of the regions visited. Many of the rocks were subsequently described by G. T. Prior (Campbell Smith & Game, 1954; Bishop *et al.*, 1984).

The Antarctic represented only one of the regions visited during the 111110 km circumglobal voyage of HMS *Challenger*, from 1872 to 1876. Again sponsored by the Admiralty, jointly with the Royal Society, this voyage, led by Captain George S. Nares, RN, (latterly Captain F. T. Thomson, RN), and Professor C. Wyville Thomson, aided by John Murray, in effect launched the new science of oceanography as a major discipline. The bulk of the world-wide zoological, botanical and geological collections are in the Museum's scientific departments. The rocks and sediments were mainly dredged from the beds of the oceans, but were occasionally collected from islands. A 20 kg boulder of biotite gneiss was dredged from *Challenger* station 157, at a latitude of nearly 54°S. This, and pebbles of schist and gneiss taken from the stomachs of seals and penguins by Robert M'Cormick during the 1842 voyage of the *Erebus* and *Terror*, might have confirmed the suggestion that an ancient land mass existed at and around the South Pole. However, it was not until almost the turn of the century that examination by G. T. Prior resulted in the realization of their true significance.

An early whaling voyage from Scotland, led in 1892–93 by Captain Alexander Fairweather and others in the *Balæna*, *Active*, *Diana* and *Polar Star*, made limited observations on animal life. The turn of the century was marked by C. E. Borchgrevink in the *Southern Cross*, conducting magnetic and meteorological studies along the coast of Victoria Land from 1898 to 1900. Rocks collected from Possession Island, Coulman Island, Franklin Island and the mainland are in the Museum's collections, presented by Sir George Newnes in 1900 and described by G. T. Prior (Campbell Smith & Game, 1954; Bishop *et al.*, 1984).

Captain Robert F. Scott, RN, led the National Antarctic Expedition of 1901–4, in an attempt to reach the South Pole after determining the extent of the land around it. The rocks collected by his party in their ship RRS *Discovery*, and relief ship *Morning*, sponsored by Government, Royal Geographical Society, Royal Society and others, include material dredged from off the Balleny Islands. Details of the rocks, described by G. T. Prior with an account of the field geology by H. T. Ferrar, are given by Campbell Smith & Game (1954) and Bishop *et al.* (1984). At much the same time, 1902–4, the Scottish National Antarctic Expedition, led by Dr William S. Bruce in the *Scotia*, was in the Weddell Sea on a scientific voyage.

In 1907–9, led by Lieut. Ernest Shackleton, RNR, the British Antarctic Expedition in the *Nimrod* followed the Scott expedition in an attempt to reach the magnetic and true South Poles and conduct scientific investigations. Various igneous, metamorphic and sedimentary rocks were collected from different areas of South Victoria Land and the Ross Archipelago (Campbell Smith & Game, 1954; Bishop *et al.*, 1984). Captain Scott's second expedition, in the *Terra Nova*, 1910–13, reached the South Pole only to find that the Norwegian Roald Amundsen, in the *Fram*, had beaten him. Scott's party completed extensive scientific work in the Ross Sea area, supported again by the Royal Society, and collected sediments and extensively from the rocks of South Victoria Land, especially the Ross Island–McMurdo Sound–Cape Adare areas; many of these rocks were described by W. Campbell Smith (Campbell Smith & Game, 1954; Bishop *et al.*, 1984). Now in the Museum's collection, they are amongst its most historically famous specimens; frequently exhibited, they support the scientifically valuable geological observations made in South Victoria Land (Moore, 1982).

Australia and Great Britain combined from 1911 to 1914 in the Australasian Antarctic Expedition, led by Sir Douglas Mawson, in the *Aurora*. The expedition was mounted for scientific and geographical research along the coast of Wilkes Land; igneous and metamorphic rocks collected from the Cape Denison area are in the Museum (Bishop *et al.*, 1984). In 1913–14, a whaling prospecting expedition set out from Scotland in the *Hanka*. During their operations in the South Shetlands, Palmer Archipelago and Graham Land, David Ferguson collected many rock specimens, subsequently described by G. W. Tyrell; some of these are now in the Museum (Campbell Smith & Game, 1954; Bishop *et al.*, 1984). Together with the *Endurance*, the *Aurora* featured again in the British Imperial Trans-Antarctic Expedition, led by Sir Ernest Shackleton. This was a government and Royal Geographical Society backed transcontinental exploration expedition. Little scientific work was carried out but some specimens were collected.

Whaling ships under J. L. Cope formed the first British expedition of the 1920s. Their objective was to map the Weddell Sea coastline; in this they were not successful but some scientific work was undertaken. In 1921–22, Sir Ernest Shackleton, sponsored by John Q. Rowett, returned to the Antarctic in the tiny *Quest*. Their purpose was to explore and map; unfortunately the ship was not up to it and Shackleton died from heart disease in January 1922, his place being taken by Frank Wild. Rocks collected on this voyage by Dr G. Vibert Douglas from South Georgia, the South Sandwich Islands and the South Shetlands Islands, and dredged from the Weddell Sea, are in the Museum's collections. Some specimens were briefly described (Campbell Smith & Game, 1954; Bishop *et al.*, 1984; Moore, 1982).

The period between 1925 and 1939 saw the initiation and operation of the Discovery Investigations. In 1923 the Discovery Committee had been established, set up by the British Colonial Office to promote oceanographic research in the region of the Falkland Islands. Initiated in 1904, the Falkland Islands Dependencies Survey was renamed in 1918 the 'Interdepartmental Committee for the Dependencies of the Falkland Islands'; it later became the British Antarctic Survey. A group of scientists, led by Drs N. A. Mackintosh, Stanley Kemp, D. Dilwyn John, G. E. R. Deacon, H. F. P. Herdman and G. W. Rayner, made repeated voyages to the Antarctic in the RRS *Discovery*, *Discovery II* and *William Scoresby* (Plates 17–20). Their purpose: oceanographical research, following the *Challenger* voyage of some 60 years before, with the results to be published from Cambridge in the *Discovery Reports* (Deacon, 1984). The focal point of the research was to be the biological and physical conditions affecting the distribution of whales, the primary interest of the leader of the first expedition, N. A. Mackintosh. Work was extended to include the study of krill, naturally; also of elephant seals; bird life; and, ashore, lichens, mosses and algae. Many geological specimens were collected including dredged rocks, which were studied by C. E. Tilley and G. W. Tyrell, and subsequently by Kempe (1973). Together with the acquisition of the *Challenger* collection,

Plate 17*a* RRS *Discovery*.

the establishment of part of the Discovery Investigations – The Whale Research Unit – in the 'Discovery Hut' in the grounds of the British Museum (Natural History) was the second major event leading to the initiation of oceanographical research in the Museum. The Whale Research Unit in 1950 became part of the newly founded National Institute of Oceanography, later to become the Institute of Oceanographic Sciences, but was subsequently transferred, in 1977, to the Sea Mammals Research Unit, British Antarctic Survey, in Cambridge.

Plate 17*b* RRS *Discovery* in 1985, being restored and open to the public in St Katharine's Dock, City of London; she is now in Dundee, where she was originally built.

From 1928 to 1930, Britain joined forces with the United States of America in an expedition planned to pioneer transatlantic flight and aerial reconnaissance. The leader was Sir Hubert Wilkins and the *William Scoresby* was used to transport the expedition southwards. At the same time, the US 1st Byrd Antarctic Expedition, under Rear-Admiral R. E. Byrd, USN (Retired), was under way and the Museum acquired some rocks collected by L. M. Gould from the Queen Maud Mountains (Campbell Smith & Game, 1954; Bishop *et al.*, 1984).

BANZARE: the British-Australian-New Zealand Antarctic Research Expedition, led by Sir Douglas Mawson, used the RRS *Discovery* from 1929 to 1931 on a scientific and geographic expedition to Crozet, Kerguelen and Heard Islands; the coast of Enderby and MacRobertson Land; and the Balleny Islands. Rocks from some of these localities are in the Museum's collections (Bishop *et al.*, 1984). The last of the pre-war British expeditions took place in 1934–37: the British Graham Land Expedition, led by John R. Rymill in the *Penola*. A small scientific and surveying expedition, it collected rocks from the Graham Land coast and nearby islands, which are now in the Museum (Campbell Smith & Game, 1954; Bishop *et al.*, 1984).

After the Second World War, British bases were set up at, among other localities, Deception Island in the South Shetlands and Signy Island in the South Orkneys. A scientific and surveying programme was carried out between 1943 and 1955, led by Lieut. Com. J. W. S. Marr and others, in the ships *William Scoresby*, *Fitzroy*, *Eagle*, *Trepassey* and *John Biscoe*, under the title Operation Tabarin and Falkland Islands Dependencies Survey; in 1962 it became the British Antarctic Survey. Within this period, a whaling expedition, prompted by the worldwide shortage of fats, was carried out in the *Balæna*, with two Walrus seaplanes, from 1946 to 1947, under Captain Reider Pedersen and John Grierson.

Britain participated from 1949 to 1952 in a scientific survey by the Norwegian-British-Swedish Antarctic Expedition in the *Norsel*, led by Captain John Giaever. Another scientific

Plate 18 RRS *William Scoresby.*

and geographical exploration expedition was the Australian National Antarctic Research Expedition, led by Phillip G. Law, from 1954 to 1955. The voyage, in the *Kista Dan*, followed up the establishment in 1947–48 of bases on Heard and Macquarie Islands by a group in the *Wyatt Earp*; this ship, however, was prevented by pack-ice from reaching the George V coast. The *Kista Dan*, an ice breaker, succeeded in reaching the MacRobertson Land coast and set up the station at Mawson.

This survey of British and Commonwealth Antarctic expeditions can be closed appropriately with the Commonwealth Transantarctic Expedition which crossed from Shackleton to Scott Base, via the South Pole, between January and March 1958, under the leadership of Sir Vivian Fuchs. Rocks collected on this crossing were presented to the Museum in 1977 by the British Antarctic Survey, while research activities by the British, Americans and Australians, to name but a few, had become routine and widespread.

Other Oceanic, Biological Expeditions

In addition to the expeditions to Antarctica leading, generally, to acquisitions of geological material by the Museum, there are, of course, a number of well-known biological expeditions which made collections of zoological and botanical specimens. Many of these also have been donated to the Museum.

Plate 19 RRS *Discovery II.*

Notes

The letters and official documents quoted or cited in the text are all held in the British Museum (Natural History). Their locations are identified by the following:
MA/ Museum Archives.
MA(M)/ Museum Archives, Department of Mineralogy records.
MA(Z)/ Museum Archives, Department of Zoology records.
ML/ Murray Library, Palaeontology and Mineralogy Library.

1. Notes on the life of Sir John Murray compiled by J. D. H. Wiseman, 16 June 1972, for the BM(NH) *Challenger* Centenary Exhibition. ML/
2. Letter, 8 April 1914, J. Chumley to E. Heron-Allen; MA(Z)/OD 1914 f. 87B.
3. Letter, 9 April 1914, E. Heron-Allen to L. Pullar; MA(Z)/OD 1914 f. 87B.
4. Letter, 10 April 1914, L. Pullar to E. Heron-Allen; MA(Z)/OD 1914 f. 87B.
5. Report on the Oceanographical Collections formed by Sir John Murray at the Villa Medusa, Edinburgh, by E. Heron-Allen and A. Earland; ML/187 f. 1–28.
6. Letter, 12 June 1919, Lady Murray to Sir F. Harmer, Director; ML/198 f. 2.
7. Letter, 7 June 1919, Director to Lady Murray; MA(Z)/OL 1919 f. 152.
8. Letter, 15 June 1919, J. C. Murray to Director; ML/198 f. 3.
9. Letter, 20 June 1919, Director to J. C. Murray; MA(Z)/OL 1919 f. 173.
10. Letter, 10 July 1919, J. C. Murray to Director; ML/198 f. 5.
11. Letter, 26 November 1919, J. C. Murray to Director; ML/198 f. 9.
12. Report to Trustees, 14 November 1919, by Director; ML/199 f. 1.
13. Letter, 22 November 1919, Director to J. C. Murray; MA(Z)/OL 1919 f. 279.
14. Letter, 4 December 1919, Director to J. C. Murray; MA(Z)/OL 1919 f. 289.

Plate 20 RRS *Discovery II* at Sandefiord Bay, Coronation Island, South Orkney Islands, 1937.

15. Report to Trustees, 19 January 1920, by Director; MA/DF 1004/CP 227 f. 88–95.
16. Internal memorandum, 23 December 1919, C. Tate Regan to Director; MA(Z)/IL 1920 f. Murray 1.
17. Letter, 4 January 1920, Lady Murray to Director; ML/198 f. 10.
18. Internal memorandum, 10 January 1920, Director to A. Smith Woodward; MA(Z)/IL 1920 f. Murray 2.
19. Reply on same memorandum, A. Smith Woodward to Director; MA(Z)/IL 1920 f. Murray 2.
20. Letter, 12 January 1920, J. H. Ashworth to Director; MA/DF 1004/CP 227 f. 96–8.
21. Report of Standing Committee, 24 January 1920; MA/DF 1004/CP 227 f. 35–9.
22. Letter, 20 January 1920, J. C. Murray to C. E. Fagan; ML/198 f. 11.
23. Letter, 30 January 1920, Director to Lady Murray; MA/DF 1001/56 f. 620–1.
24. Letter, 31 January 1920, Lady Murray to Director; ML/198 f. 12.
25. Letter, 2 February 1920, J. C. Murray to Director; ML/198 f. 13.
26. Letter, 4 February 1920, J. C. Murray to Director; ML/198 f. 14.
27. Letter, 18 March 1920, J. C. and T. H. Murray to Director; MA/DF 1004/CP 227 f. 33.
28. Report to Trustees, 24 March 1920; MA/DF 906/SC f. 3702.
29. Letter, 29 April 1920, C. E. Fagan to J. C. Murray; MA/DF 1004/CP 227 f. 31.
30. Letter, 12 March 1920, Harvard University to J. C. Murray; MA(Z)/IL 1920–25 f. Murray 1a.
31. Letter, 14 October 1921, Director to J. C. Murray; MA/DF 967/File 1 f. 147.
32. Report to Trustees, 16 October 1926; MA/DF 1004/CP 227 f. 41–2.
33. Memorandum, 12 August 1920, Office of Works to C. E. Fagan; MA(Z)/OD 1920 f. 134.
34. Memorandum, 9 September 1920, Office of Works to Director; MA/DF 1004/CP 227 f. 75.
35. Report to Trustees, 20 October 1920; MA/DF 1004/CP 227 f. 72–4.
36. Memorandum, 1 December 1920, Office of Works to Director; MA(Z)/OD 1920 f. 189.
37. Memorandum, 22 December 1920, Office of Works to Director; MA(Z)/OD 1920 f. 206.
38. Memorandum, 31 January 1921, Office of Works to Director; MA(Z)/OD 1921 f. 23.

39. Letter, 31 January 1921, Director to J. C. Murray; MA(Z)/OD 1921 f. 24.
40. Letter, 7 March 1921, J. C. Murray to Director; MA(Z)/OD 1921 f. 52.
41. Letter, 16 March 1921, Director to Graham Kerr; MA(Z)/OD 1921 f. 55.
42. Letter, 9 April 1921, Graham Kerr to Director; MA(Z)/OD 1921 f. 63.
43. Letter, 18 April 1921, Director to Graham Kerr; MA(Z)/OD 1921 f. 64.
44. Letter, 20 April 1921, J. Chumley to Director; MA(Z)/OD 1921 f. 67a.
45. Internal memorandum, 21 April 1921, Director to C. Tate Regan; MA(Z)/OD 1921 f. 67.
46. Internal memorandum, 25 April 1921, C. Tate Regan to Director; MA(Z)/OD 1921 f. 67.
47. Letter, 28 April 1921, Director to J. C. Murray; MA/DF 1004/CP 227 f. 29.
48. Internal memorandum, 18 July 1921, C. Tate Regan to Trustees; MA/DF 1004/CP 227 f. 63.
49. Letter, 26 July 1921, C. Tate Regan to J. C. Murray; ML/201 f. 1.
50. Letter, 29 July 1921, J. C. Murray to W. T. Calman; ML/201 f. 2.
51. Internal memorandum, 13 October 1921, C. Tate Regan to Trustees; MA/DF 1004/CP 227 f. 58.
52. Letter, 14 October 1921, Director to J. C. Murray; MA/DF 967/File 1 f. 147.
53. Internal memorandum, 18 October 1921, C. Tate Regan to W. T. Calman; ML/201 f. 10.
54. Letter, 15 November 1921, Director to J. C. Murray; MA/DF 1004/CP 227 f. 49.
55. Letter, 17 November 1921, H. G. Lyons, Director, Science Museum, to Director; ML/202 f. 1.
56. Letter, 22 November 1921, H. G. Lyons to Director; ML/202 f. 2.
57. Letter, 23 November 1921, H. G. Lyons to Director; ML/202 f. 3.
58. Internal memorandum, 19 December 1921, G. T. Prior to W. T. Calman; ML/202 f. 4.
59. Internal memorandum, 23 December 1921, G. T. Prior to W. T. Calman; ML/202 f. 5.
60. Memorandum, 28 June 1922, P. R. Lowe to C. Tate Regan; ML/202 f. 6.
61. Letter, 27 June 1922, Director to Messrs Davidson and Syme; MA/DF 1004/CP 227 f. 46.
62. Letter, 17 October 1921, Director to J. Stanley Gardiner; MA/DF 1004/CP 227 f. 53.
63. Letter, 22 October 1921, J. Stanley Gardiner to Director; MA/DF 1004/CP 227 f. 52.
64. Internal memorandum, 25 October 1921, Director to F. A. Bather; MA/DF 1004/CP 227 f. 51.
65. Reply (no date) on same memorandum, F. A. Bather to Director; MA/DF 1004/CP 227 f. 51.
66. Letter, 26 October 1921, Director to R. Dykes; MA/DF 1004/CP 227 f. 50.
67. Letter, 19 May 1932, J. Stanley Gardiner to Trustees; MA/DF 1004/CP 367 f. 36–8.
68. Letter, 3 June 1932, C. Tate Regan, Director, to J. Stanley Gardiner; MA/DF 1004/CP 367 f. 35.
69. Letter, 20 June 1933, J. C. Murray to Director; MA/DF 1004/CP 367 f. 34.
70. Letter, 29 June 1933, Director to J. C. Murray; MA/DF 1004/CP 367 f. 33.
71. Letter, 22 October 1934, J. C. Murray to Director; MA/DF 1004/CP 367 f. 30–1.
72. Letter, 13 November 1934, Director to J. C. Murray; MA/DF 1004/CP 367 f. 27.
73. Letter, 21 June 1939, Director to Sir S. Gaselee; MA/DF 1004/CP 367 f. 10.
74. Letter, 13 July 1939, Sir S. Gaselee to Museum Secretary; MA/DF 1004/CP 367 f. 9.
75. Letter, 18 September 1939, Sir S. Gaselee to Museum Secretary; MA/DF 1004/CP 367 f. 8.
76. Internal memorandum, 14 December 1949, Keeper of Zoology to Secretary; MA/DF 1004/CP 367 f. 6.
77. Letter, 27 July 1934, J. C. Murray to J. Stanley Gardiner; MA/DF 1004/CP 227 f. 26.
78. Letter, 30 July 1934, J. Stanley Gardiner to Director; MA/DF 1004/CP 227 f. 27.
79. Letter, 13 August 1934, Director (for Trustees) to Treasury; MA/DF 1004/CP 227 f. 24–5.
80. Letter, 18 September 1934, Treasury to Trustees; MA/DF 1004/CP 227 f. 23.
81. Letter, 11 March 1935, J. Stanley Gardiner to Director; MA/DF 1004/CP 367 f. 22.
82. Report, 18 November 1935, G. F. Herbert Smith to Trustees; MA/DF 1004/CP 227 f. 15–16.
83. Letter, 28 November 1935, Director to Bernard Smith; MA/DF 1004/CP 227 f. 14.
84. Internal memorandum, 23 June 1936, Director's Office to G. F. Herbert Smith; MA/DF 1004/CP 227 f. 9–10.
85. Report, 25 July 1936, G. F. Herbert Smith to Trustees; MA/DF 906/SC f. 50, 62.
86. Internal memorandum, 10 April 1937, G. F. Herbert Smith to Director; MA/DF 1004/CP 367 f. 13.
87. Report, 17 April 1937, G. F. Herbert Smith to Trustees; MA/DF 1004/CP 367 f. 12.
88. Internal memorandum, 22 November 1937, W. Campbell Smith to Director; MA/DF 1004/CP 227 f. 8.
89. Internal memorandum, 23 November 1937, Director to W. Campbell Smith; MA/DF 1004/CP 227 f. 7.
90. Letter, 16 February 1944, Sir J. A. Edgell, Hydrographer of the Navy, to J. D. H. Wiseman; MA(M)/DF 28 f. 92.
91. Letter, 3 March 1944, Hydrographer to J. D. H. Wiseman; MA(M)/DF 28 f. 91.
92. Proposal for National Oceanographic Institute, summary by G. E. R. Deacon; MA(M)/DF 28 f. 93–5.

93. Letter, 21 June 1944, J. D. H. Wiseman to J. N. Carruthers; MA(M)/DF 28 f. 78–9.
94. Proposals on the work of the new National Oceanographic Institute; MA(M)/DF 28 f. 76–7.
95. Memorandum, 20 March 1944, J. R. Lumby to Hydrographer; MA(M)/DF 28 f. 85.
96. Memorandum, 5 July 1944, to Hydrographic Department, Bath; MA(M)/DF 28 f. 63.
97. Letter, 5 August 1944, J. D. H. Wiseman to Hydrographer; MA(M)/DF 28 f. 55–7.
98. Letter, 24 November 1947, D. C. Martin to J. D. H. Wiseman; MA(M)/DF 28 f. 36.
99. Royal Society Communication NGG/7(47), 10 December 1947; MA(M)/DF 28 f. 32.

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Charles Darwin's Notebooks, 1836–1844

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W. G. Tremewan

Ellis & Solander's '*Zoophytes*', 1786

Paul F. S. Cornelius
John W. Wells

Historical series
Vol 16 No 1

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Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur

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Synopsis

C. F. Freyer's *Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur* was published in seven volumes, comprising 120 Hefte or parts, over a period of 28 years. Original wrappers of the Hefte are preserved in one of the copies examined; those of the first third lack publication dates, but these have been established with reasonable accuracy from evidence obtained from literature contemporary with Freyer's work. A collation of the seven volumes is provided and includes the publication date of each Heft. Biographical notes briefly describe Freyer's life and background. The annex consists of a check-list of species of the genus *Zygaena* Fabricius which were described, illustrated or mentioned by Freyer, and includes 10 nominal taxa attributable to him.

Introduction

C. F. Freyer's seven-volume work entitled *Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur* comprises 120 Hefte which were published in Augsburg from 1831–1858. Each volume contains descriptions of the adults, early stages and foodplants of Palaearctic butterflies and moths which are illustrated in 700 beautiful hand-coloured plates. These plates, which are remarkably consistent in quality between the different copies examined, were executed by Freyer himself who paid great attention to detail and accuracy and commented that the figures of the larvae and foodplants were based on living material collected in the wild. A portrait of Freyer (Fig. 1) is reproduced from an original by Hanfstaengl and forms the frontispiece to volume 1.

Five complete copies of this rare work have been examined: three in the Entomology Library, British Museum (Natural History), one ex libris H. T. Stainton and now in the library of the Royal Entomological Society, London, and one ex libris L. G. Higgins, now in the Hope Library, University Museum, Oxford. Of the three copies in the British Museum

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(Natural History), one is ex libris Lord Walsingham, another ex libris Lord Rothschild, the last is the 'original' British Museum (Natural History) copy from an unknown source.

The last-mentioned copy is the most interesting because an almost complete set of original wrappers from each Heft are bound together and included at the end of volume 7; only the wrappers of Hefte 1 and 3 are missing. The Heft and plate numbers have been added, in contemporary handwriting (Fig. 5), to the wrappers of Hefte 2, 4–58, 66, 71, 74 and 80; however, on each wrapper of Hefte 59–65, 67–70, 72, 73, 75–79 and 81–120 the number of the Heft, the numbers of the plates contained in that Heft, and its date of publication, are part of the original printing (Fig. 6). One discrepancy must be noted: the wrapper of Heft 24 is an original of Heft 117 and bears the printed date '1857', but the Heft number has been crossed out and bears the handwritten number '24', while the plate numbers have been altered to '139–144'.

Copies of Freyer's *Neuere Beiträge* in which the original wrappers are preserved must be very rare indeed. For example, Hagen (1862: 251) merely cites the title-page date for each volume. Sherborn (1922: lvi) rather surprisingly lists only volumes 1–6, which he dates 1831–1852, and states that the 'Dates can be made out from Isis and Arch. f. Nat.', thus implying that he had not seen volume 7 and the included original wrappers of the copy described above, especially as some of his manuscript dates are pencilled on slips of paper and attached to the title-pages of volumes 1–6. Some of these dates and those cited in *Index Animalium* are at variance with those printed on the wrappers, moreover, it is significant that no handwritten notes concerning the Heft numbers and their dates of publication were attached by Sherborn to the title-page of volume 7. Junk (1926: 130) dates the whole of Freyer's work 1833–1858; although he gives (1831–) 1833 for volume 1, he cites only the title-page dates for the remaining volumes. Junk also states that copies of Freyer's *Neuere Beiträge* are very rare. Horn & Schenkling (1928: 382–383) cites the title-page date for each volume, while Nissen (1969: 150) dates the whole work (1831–) 1833–1858, and refers to Horn & Schenkling and Junk.

As far as I know, Heppner (1982: 94) is the only person who has attempted to clarify and establish the publication dates of the 120 Hefte which make up the seven volumes of Freyer's *Neuere Beiträge*. Unfortunately, Heppner's collation is not only confusing but, together with some of the dates that he provides, is sometimes incorrect. For example, he cites groups of page numbers for volumes 2–6 without relating them to the Hefte and, in so doing, splits most of the Hefte of these volumes. In some cases two different dates are thus provided for parts of one and the same Heft. Moreover, he states that no wrapper dates are available for the Hefte of volume 7, thereby implying that he had seen wrappers for volumes 1–6. However, he neither describes the copy or copies that he has examined, nor does he provide any information on their depository. Heppner's statement that the plates are undated is also confusing – while it is true that they are not individually dated, they are, like the text, clearly associated with their respective wrappers. Apart from the fact that the plate numbers are recorded on the wrappers, each plate is also referred to in the text, and the relevant Heft number appears in the top left-hand corner on each plate (Fig. 4).

The undated Hefte recorded in contemporary literature

As noted by Sherborn (1922: lvi), the dates of the Hefte can be ascertained from contemporary literature. For the purposes of this paper, a search has been made only for the period 1832–1844 in order to establish the dates of those Hefte which have undated wrappers; the printed dates on the wrappers of Hefte 59–65, 67–70, 72, 73, 75–79 and 81–120 are accepted as being correct.

Hefte reviewed or recorded in *Isis von Oken*

Hefte 1–4, dated 1831: Anonymous, 1832, *Isis, Leipzig* **1832** (7): 753–755.
Hefte 5, 6, dated 1831: Anonymous, 1833, *Isis, Leipzig* **1833** (9): 906.

Hefte 10–15, dated 1832, Heft 16, dated 1833: Anonymous, 1834, *Isis, Leipzig* **1834** (3): 316–317.
Heft 17, not dated: Boie, 1834, *Isis, Leipzig* **1834** (4): 384–385.
Hefte 17–20, dated 1833, Hefte 21–24, dated 1834: Anonymous, 1835, *Isis, Leipzig* **1835** (2): 115–116.
Hefte 25–30, dated 1835: Anonymous, 1835, *Isis, Leipzig* **1835** (11): 996.
Hefte 31–36, dated 1856 [*sic* – *recte* 1836]: Anonymous, 1837, *Isis, Leipzig* **1837** (2): 116.
Hefte 37–40, not dated: Anonymous, 1837, *Isis, Leipzig* **1837** (11): 837–838.
Hefte 41–44, dated 1837: Anonymous, 1838, *Isis, Leipzig* **1838** (5): 374.
Hefte 45–48, dated 1838–1839: Anonymous, 1839, *Isis, Leipzig* **1839** (3): 227.
Hefte 49–52, dated 1839: Anonymous, 1840, *Isis, Leipzig* **1840** (4): 302–303.
Hefte 53, 54, dated 1840: Anonymous, 1840, *Isis, Leipzig* **1840** (4): unpaginated contents list, etc.
Hefte 57–60, dated 1840: Anonymous, 1841, *Isis, Leipzig* **1841** (4): unpaginated contents list, etc.
Hefte 57–60, dated 1841: Anonymous, 1841, *Isis, Leipzig* **1841** (10): 815–816.
Hefte 65, 66, dated 1842: Anonymous, 1843, *Isis, Leipzig* **1843** (2): 154.
Hefte 71–74, dated 1843 and 1844: Anonymous, 1844, *Isis, Leipzig* **1844** (12): 941–942.

Hefte recorded in *Archiv für Naturgeschichte*

The dates cited by Burmeister and Erichson in *Archiv für Naturgeschichte* are often later than those recorded anonymously in *Isis von Oken*; most are probably incorrect or unreliable.

Hefte 1–16, 17–22 (Hefte 21, 22 dated 1834 by inference): Burmeister, 1835, *Arch. Naturgesch.* **1** (2): 53.
Hefte 23–27, dated 1835: Burmeister, 1836, *Arch. Naturgesch.* **2** (2): 316.
Hefte 28–34, dated 1836: Erichson, 1837, *Arch. Naturgesch.* **3** (2): 324.
Hefte 35–37, dated 1837: Erichson, 1838, *Arch. Naturgesch.* **4** (2): 248.
Hefte 38–44, dated 1838: Erichson, 1839, *Arch. Naturgesch.* **5** (2): 361.
Hefte 45–50, dated 1839: Erichson, 1840, *Arch. Naturgesch.* **6** (2): 295.
Hefte 51–56, dated 1840: Erichson, 1841, *Arch. Naturgesch.* **7** (2): 221.
Heft 57, dated 1841: Erichson, 1842, *Arch. Naturgesch.* **8** (2): 285, 288, 289.
Hefte 58–68, dated 1842: Erichson, 1843, *Arch. Naturgesch.* **9** (2): 246.

Miscellaneous references to Hefte

Sodoffsky (1837, *Bull. Soc. imp. Nat. Moscou* **1837** (7): 112) recorded that 38 Hefte, i.e. volumes 1, 2 and part of 3, had appeared and dated the whole work 1831!

Freyer (1841, *Stettin. ent. Ztg* **2**: 48) advertised Hefte 1–60 which he dated 1833–1841. Subsequently, Freyer (1876, *Dt. ent. Z.* **20** (3): 15) stated that his *Neuere Beiträge* was still available and dated it 1833–1868 [*sic*].

Collation and dates of volumes 1–7

The dates of publication of Hefte 1–58, 66, 71, 74 and 80 have been established primarily on evidence culled from contemporary literature; for the remaining Hefte the dates printed on the wrappers are accepted as being correct. Each volume contains an undated, unpaginated index which, in most of the copies examined, is bound in after the title-page. It is assumed that an index and title-page were always issued together with the last Heft of each volume, therefore the date of publication of each index has been established from the title-page date. In the following collation, a date is enclosed in parentheses 'if it is not specified, but demonstrated by evidence derived from the work itself;', or in square brackets 'if it is demonstrated only by external evidence.' (*International Code of Zoological Nomenclature*, 3rd edn (1985), Recommendation 22A (4), (5)).

Volume 1: title-page and verso, pp. [i]–[ii] (index), i–iv, 5–182, pls 1–96 ([1831]–1833).

Heft	pages	plates	date
1	i–iv, 5–12	1–6	[1831]
2	13–24	7–12	[1831]
3	25–34	13–18	[1831]
4	35–46	19–24	[1831]
5	47–56	25–30	[1831]
6	57–68	31–36	[1831]
7	69–80	37–42	[1831][1]
8	81–96	43–48	[1832][1]
9	97–108	49–54	[1832][1]
10	109–116	55–60	[1832]
11	117–124	61–66	[1832]
12	125–136	67–72	[1832]
13	137–146	73–78	[1832]
14	147–154	79–84	[1832]
15	155–162	85–90	[1832]
16	163–182	91–96	[1833]
Frontispiece			1833
Title-page			1833
Index	[i]–[ii]		(1833)

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1) The dates cited above for Hefte 7–9 are arbitrary as I have been unable to establish them from evidence in contemporary literature. On p. 79 (Heft 7), Freyer published a note written by Büringer in November 1831, and Sherborn has dated Heft 7 '1831' in his manuscript notes attached to the title-page of volume 1. The nominal taxon *Plusia ancora* Freyer, described on p. 89 (Heft 8), is dated '1832' by Sherborn (1923: 302). Of interest is a reference by Freyer on p. 102 (Heft 9) to 'May h. J. (1831)', i.e. May of this year, but this does not necessarily mean that Heft 9 was published in 1831; Sherborn has dated Hefte 8 and 9 '1832' in the aforementioned manuscript notes. In the absence of evidence to the contrary, the publication dates of Hefte 7–9 are therefore based on those of Sherborn.

Volume 2: title-page and verso, pp. [i]–[ii] (index), i–ii, 3–162, pls 97–192 ([1833]–1836).

Heft	pages	plates	date
17	i–ii, 3–12	97–102	[1833]
18	13–22	103–108	[1833]
19	23–32	109–114	[1833]
20	33–42	115–120	[1833]
21	43–54	121–126	[1834]
22	55–62	127–132	[1834]
23	63–74	133–138	[1834]
24	75–84	139–144	[1834]
25	85–96	145–150	[1835]
26	97–104	151–156	[1835]
27	105–112	157–162	[1835]
28	113–120	163–168	[1835]
29	121–128	169–174	[1835]
30	129–138	175–180	[1835]
31	139–148	181–186	[1836]
32	149–162	187–192	[1836]
Title-page			1836
Index	[i]–[ii]		(1836)

Volume 3: title-page and verso, pp. [i]–[ii] (index), 1–134, pls 193–288 ([1836]–1839).

Heft	pages	plates	date
33	1–10	193–198	[1836]
34	11–20	199–204	[1836]
35	21–28	205–210	[1836]
36	29–36	211–216	[1836]
37	37–44	217–222	[1837][2]
38	45–52	223–228	[1837][2]
39	53–60	229–234	[1837][2]
40	61–68	235–240	[1837][2]
41	69–76	241–246	[1837]
42	77–84	247–252	[1837]
43	85–92	253–258	[1837]
44	93–100	259–264	[1837]
45	101–108	265–270	[1839][2]
46	109–116	271–276	[1839][2]
47	117–126	277–282	[1839][2]
48	127–134	283–288	[1839][2]
Title-page			1839
Index	[i]–[ii]		(1839)

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[2] Sherborn has given '1837' as the publication date of Heft 37 in his manuscript notes which are attached to the title-page of volume 3; presumably this is based on the records published by Erichson (see p. 3) and is accepted here in the absence of any other evidence. In the same notes Sherborn has dated Hefte 38–44 '1838'; however, Heft 38 must have been published not later than 1837 as in that year Sodoffsky (see p. 3) recorded that 38 Hefte had been issued. As there is evidence that Heft 41 was published in 1837, it follows that Hefte 39 and 40 were also issued in that year. Hefte 45–48 are dated '1839' in the afore-mentioned manuscript notes, the date presumably being based on Erichson's records. It is logical to assume that Heft 48 was published in 1839 as presumably it was issued with the title-page which bears that date.

Volume 4: title-page and verso, pp. [i]–[ii] (index), i–ii, 3–167, pls 289–384 ([1839]–1842).

Heft	pages	plates	date
49	i–ii, 3–12	289–294	[1839]
50	13–22	295–300	[1839]
51	23–30	301–306	[1839]
52	31–38	307–312	[1839]
53	39–48	313–318	[1840]
54	49–58	319–324	[1840]
55	59–68	325–330	[1840][3]
56	69–80	331–336	[1840][3]
57	81–92	337–342	[1841][3]
58	93–102	343–348	[1841][3]
59	103–116	349–354	1841
60	117–124	355–360	1841
61	125–136	361–366	1841
62	137–146	367–372	1841
63	147–156	373–378	1842
64	157–167	379–384	1842
Title-page			1842
Index	[i]–[ii]		(1842)

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[3] The dates of publication of Hefte 55–58 are enigmatic. Hefte 55 and 56 were recorded by Erichson and dated '1840' (see p. 3); the same date is given by Sherborn in his manuscript notes attached to the title-page of volume 4, and presumably was based on the evidence

supplied by Erichson. Hefte 57 and 58 are dated '1840' on the back of the wrapper of Heft 4 of *Isis von Oken* (1841) but are dated '1841' by the anonymous reviewer on p. 815 of the same journal (see p. 3). In 1842 Erichson recorded Heft 57 and dated it '1841', but in 1843 Hefte 58–68 were recorded by him and dated '1842' (see p. 3). The wrappers of Hefte 59–62 bear the printed date '1841', thus indicating that Erichson's citation of dates cannot be relied upon. In the afore-mentioned manuscript notes of Sherborn, Heft 57 is dated '1841', and Hefte 58–64 are dated '1842'; it therefore appears that Sherborn also based these dates on those of Erichson. In view of what has just been said, the establishment of the publication dates of Hefte 55–58 is arbitrary. However, based on such evidence, the date of Hefte 55 and 56 is considered to be 1840, and that of Hefte 57 and 58 to be 1841 (the latter date is based on the anonymous review in *Isis von Oken* as the dates provided in those reviews are more consistent and logical.

Volume 5: title-page and verso, pp. [i]–[ii] (index), i–ii, 3–166, pls 385–480 (1842–1845).

Heft	pages	plates	date
65	i–ii, 3–14	385–390	1842
66	15–24	391–396	[1842][4]
67	25–32	397–402	1842
68	33–44	403–408	1843
69	45–52	409–414	1843
70	53–62	415–420	1843
71	63–74	421–426	[1843][4]
72	75–86	427–432	1844
73	87–96	433–438	1844
74	97–106	439–444	[1844][4]
75	107–116	445–450	1844
76	117–124	451–456	1845
77	125–134	457–462	1845
78	135–144	463–468	1845
79	145–156	469–474	1845
80	157–166	475–480	(1845)[4]
Title-page			1845
Index	[i]–[ii]		(1845)

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4) The wrappers of Hefte 66, 71, 74 and 80 are of the kind shown in Fig. 5, i.e. they lack dates and the Heft and plate numbers have been added in contemporary handwriting. However, the publication dates of Hefte 66 and 74 must be 1842 and 1844 respectively, because the wrappers of Hefte 65 and 67 bear the date 1842 and those of 73 and 75 are dated 1844. It is assumed that Heft 80 was published in 1845 together with the title-page which bears that date. The date of Heft 71 is enigmatic as the wrapper dates of Hefte 70 and 72 are 1843 and 1844 respectively. The nominal taxon *Lycaena balkanica* Freyer, described on p. 63 (Heft 71), is dated 1844 by Sherborn (1924: 645) who also gives the same date for Heft 71 in his manuscript notes attached to the title-page of volume 5. However, Hefte 71–74 were reviewed in *Isis von Oken* (see p. 3) and dated 1843 *and* 1844; Heft 71 must therefore have been published in 1843 and this date is accepted here. The dates of Hefte 65, 66 and 71–74 that are cited in *Isis von Oken* (see p. 3) also confirm the dates established above for Hefte 66 and 74. It is possible that wrappers bearing printed dates were also issued and are still extant; however, until such wrappers are discovered, the dates for these Hefte should be placed in square brackets.

Volume 6: title-page and verso, pp. [i]–[ii] (index), 1–106, 105–168, 177–195, pls 481–600 (1846–1852).

Heft	pages	plates	date
81	1–12	481–486	1846
82	13–20	487–492	1846
83	21–28	493–498	1847
84	29–36	499–504	1847
85	37–48	505–510	1847
86	49–60	511–516	1847
87	61–68	517–522	1848
88	69–78	523–528	1848
89	79–88	529–534	1849
90	89–96	535–540	1849
91	97–106	541–546	1850
92	105–112[5]	547–552	1850
93	113–120	553–558	1850
94	121–130	559–564	1850
95	131–142	565–570	1851
96	143–152	571–576	1851
97	153–160	577–582	1851
98	161–168	583–588	1851
99	177–186[5]	589–594	1852
100	187–195	595–600	1852
Title-page			1852
Index	[i]–[ii]		(1852)

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5) The pages of Heft 91 are numbered 97–106, while those of Heft 92 are numbered 105–112, moreover, those of Heft 99 are numbered 177–186 and do not follow on from those of Heft 98. The plates associated with these Hefte are correctly numbered and it is the pagination which is incorrect, thus giving the impression that some pages are missing.

Volume 7: title page and verso, pp. [i]–[ii] (index), 1–178, pls 601–700 (1853–1858).

Heft	pages	plates	date
101	1–12	601–605	1853
102	13–20	606–610	1853
103	21–28	611–615	1853
104	29–38	616–620	1854
105	39–46	621–625	1854
106	47–54	626–630	1854
107	55–62	631–635	1854
108	63–70	636–640	1854
109	71–78	641–645	1855
110	79–86	646–650	1855
111	87–96	651–655	1856
112	97–104	656–660	1856
113	105–114	661–665	1856
114	115–124	666–670	1856
115	125–132	671–675	1856
116	133–142	676–680	1857
117	143–150	681–685	1857
118	151–158	686–690	1857
119	159–168	691–695	1858
120	169–178	696–700	1858
Title-page			1858
Index	[i]–[ii]		(1858)

Biographical notes on C. F. Freyer

Christian Friedrich Freyer (Fig. 1), the eldest son of Georg Ludwig Freyer and Henrike, *née* Meyer, was born in Wassertrüdingen, Bavaria, on 25 August 1794 and died in Augsburg on 10 November 1885 (Wulzinger, 1887). After his education at the local elementary and grammar schools he was employed as an administrator at Schloss Colberg in Ansbach and in 1820 took up a similar post in Augsburg where he lived for the remainder of his life. His wife Caroline, *née* Pluntky, whom he married in 1821, was from Ansbach and they had six children.

As a child Freyer was interested in natural history, especially entomology, and had already formed a small collection. In later years he collected with tireless enthusiasm during his spare time and on such occasions was supported and helped by his wife. He always attempted to recognize and identify the foodplants of the butterflies and moths that they found and, as he was interested in their early stages, he constructed rearing cages so that he could study their life histories more easily. He also exchanged specimens with other entomologists and his collection was distinguished by its size and neatness and the rarity of the species it contained.

Freyer's first major work to be published was *Beiträge zur Geschichte europäischer Schmetterlinge mit Abbildungen nach der Natur* which was issued in 24 pocket-sized Hefte from [1827]–1830 and formed three volumes. The publication of this work earned him recognition in the entomological world and resulted in correspondence with contemporary specialists at home and abroad. His *Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur*, the subject of the present paper, was his final major contribution to the entomological literature and is indeed the most important. In order to produce the best illustrations possible, he had learned the art of copper engraving and took pride in the fact that all his figures were drawn and painted by himself, moreover, those depicting the early stages were always based on living material and not copied from other people's work. Not only were his publications regarded with esteem by contemporary Lepidoptera specialists, but through his illustrations Freyer was also recognized as an artist. In addition to the two major works just mentioned, he published a number of short articles on Lepidoptera and a book on the pest species of butterflies and moths occurring in Germany.

In 1848 Freyer joined the local natural history society in Augsburg and later served on its council. He helped to build up the society's collection by donating specimens and eventually he became its curator. It is regrettable that Freyer's personal collection was split up after his death (Horn & Kahle, 1935: 82) as it contained much original material of the species that he had described and named himself. (Regarding the genus *Zygaena* Fabricius, only two syntypes have so far been traced (Tremewan, 1961: 282).)

Following the death of his wife in 1869, Freyer applied for retirement from the administrative service in the spring of 1870, having served the town of Augsburg for 50 years – he was already in his 76th year.

Acknowledgements

I am indebted to the following for help in various ways: Mrs B. Leonard, Librarian, Royal Entomological Society, London; Mrs Audrey Z. Smith, Hope Librarian, University Museum, Oxford; Miss Pamela Gilbert, Entomology Library, and Dr K. Sattler, Department of Entomology, British Museum (Natural History).

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Annex

The bibliographical data provided above are a direct result of research which was done to establish the correct dates of publication of the nominal taxa described by Freyer in the genus *Zygaena* Fabricius, 1775 (Lepidoptera: Zygaenidae). A check-list of these taxa follows.

Check-list of *Zygaena* Fabricius described, illustrated or mentioned by Freyer

This check-list comprises the nominal taxa described by Freyer in his *Neuere Beiträge zur Schmetterlingskunde mit Abbildungen nach der Natur*, volumes 1–7; those species which were described by other authors and illustrated or referred to by Freyer are also listed. No attempt has been made to establish the priority or validity of the names attributable to Freyer, as this will be dealt with in a forthcoming systematic catalogue of the Zygaeninae (Hofmann & Tremewan, in prep.). The nominal taxa are arranged chronologically in the check-list, i.e. in the order of their publication in Freyer's work. Names that are attributable to Freyer are marked with an asterisk (*). The authority of taxa described by other authors is that referred to by Freyer and therefore is not necessarily correct; however, if Freyer cited such a taxon without an author, the latter is provided in square brackets and is either correct or the one that Freyer had used previously. The names of the taxa described by other authors which have been misspelt by Freyer are listed as originally cited by him and misspellings have not been corrected.

At the beginning of each species description, Freyer cited a genus number and the name of the genus in which he placed the species, followed by a species number and the name of the species; however, the species name is always prefixed by a genus name (abbreviated or in full) which is often different from that first cited and is one that was used by Linnaeus or other earlier authors. For example, the *Zygaena* species first listed and described by Freyer (**1**: 28) is cited as follows: 'Gen. XIX. Zygaena. 20. Sp[hinx]. Oxytropis.'. At the XII International Congress of Zoology, Hemming (1936: 185) reported that the following Opinion had been adopted by the International Commission of Zoological Nomenclature: 'In interpreting the generic names assigned by FREYER in his *Neuere Beiträge zur Schmetterlingskunde* to the species there described, each species is to be regarded as having been described by FREYER as belonging to the genus cited by him at the head of each description and not to the genus with which he actually associated the specific name . . .'. For the purposes of homonymy the species listed below were therefore all described in *Zygaena* and not in *Sphinx* Linnaeus.

*__Zygaena oxytropis__ Freyer, [1831], **1**: 28, pl. 14, fig. 2.
Zygaena cynarae Hübner; Freyer, [1831], **1**: 28, pl. 14, fig. 3.
Zygaena triptolemus Hübner; Freyer, [1831], **1**: 28, pl. 14, fig. 4.
Zygaena minos Hübner; Freyer, [1832], **1**: 156, pl. 86. fig. 1.
Zygaena hippocrepidis Hübner; Freyer, [1832], **1**: 157, pl. 86, figs 2, 3.
Zygaena triptolemus Treitschke; Freyer, [1835], **2**: 114, pl. 164, figs 1, 2.
Zygaena glycirrhiza Hübner; Freyer, [1835], **2**: 116, pl. 164, fig. 3.

Zygaena cytisi Hübner; Freyer, [1835], **2**: 116, pl. 164, fig. 4.
Zygaena laeta Hübner; Freyer, [1836], **3**: 12, pl. 200, fig. 1.
Zygaena exulans Hübner; Freyer, [1836], **3**: 13, pl. 200, fig. 2.
Zygaena rubicundus Hübner; Freyer, [1836], **3**: 13, pl. 200, fig. 3.
Zygaena trifolii Hübner; Freyer, [1836], **3**: 14, pl. 200, fig. 4.
Zygaena dorycnii Ochsenheimer; Freyer, [1839], **3**: 120, pl. 278, fig. 3.
****Zygaena stentzii*** Freyer, [1839], **3**: 120, pl. 278, fig. 4.
Zygaena exulans [Hübner]; Freyer, [1839], **3**: 134.
Zygaena cynarae Hübner; Freyer, 1841, **4**: 106, pl. 350, fig. 1.
Zygaena carneolica Esper; Freyer, 1841, **4**: 107, pl. 350, fig. 2.
Zygaena sedi Hübner; Freyer, 1841, **4**: 107, pl. 350, figs 3, 4.
Zygaena stoechadis Hübner; Freyer, 1841, **4**: 138, pl. 368, figs 1–4.
****Zygaena anthillidis*** Freyer, 1842, **5**: 27, pl. 398, fig. 3.
Zygaena achilleae [Esper]; Freyer, 1843, **5**: 44.
Zygaena glycirrhizae [Hübner]; Freyer, 1843, **5**: 44.
****Zygaena oxytropis*** Freyer; Freyer, 1843, **5**: 44.
Zygaena hippocrepidis Hübner; Freyer, 1843, **5**: 44.
Zygaena onobrychis [Denis & Schiffermüller]; Freyer, 1843, **5**: 44.
Zygaena fausta [Linnaeus]; Freyer, 1843, **5**: 61.
Zygaena fausta [Linnaeus]; Freyer, [1843], **5**: 74.
****Zygaena favonia*** Freyer, 1844, **5**: 76, pl. 428, fig. 1.
Zygaena lonicerae Hübner; Freyer, 1844, **5**: 108, pl. 446, figs.
Zygaena astragali Borkhausen; Freyer, 1845, **5**: 117, pl. 452, figs.
****Zygaena pythia*** Freyer, 1845, **5**: 152, pl. 473, fig. 1.
****Zygaena contaminei*** Freyer, 1847, **6**: 39, pl. 506, fig. 1.
Zygaena dahurica Boisduval; Freyer, 1847, **6**: 39, pl. 506, fig. 2.
Zygaena syracusii Zeller; Freyer, 1847, **6**: 39, pl. 506, figs 3, 4.
Zygaena hippocrepidis [Hübner]; Hepp *in* Freyer, 1849, **6**: 88.
Zygaena fausta [Linnaeus]; Hepp *in* Freyer, 1849, **6**: 88.
****Zygaena oribasus*** Freyer, 1851, **6**: 135, pl. 568, fig. 1.
****Zygaena laphria*** Freyer, 1851, **6**: 135, pl. 568, fig. 2.
****Zygaena ganimedes*** Freyer, 1851, **6**: 136, pl. 568, fig. 3.
****Zygaena dsidsilia*** Freyer, 1851, **6**: 136, pl. 568, fig. 4.
Zygaena fausta Treitschke; Freyer, 1851, **6**: 154, pl. 578, figs.
Zygaena exulans Hübner; Freyer, 1852, **6**: 178, pl. 590, fig. 1.
Zygaena laeta Hübner; Freyer, 1854, **7**: 64, pl. 637, fig. 1.
Zygaena onobrychis Hübner; Freyer, 1854, **7**: 66, pl. 637, fig. 2.

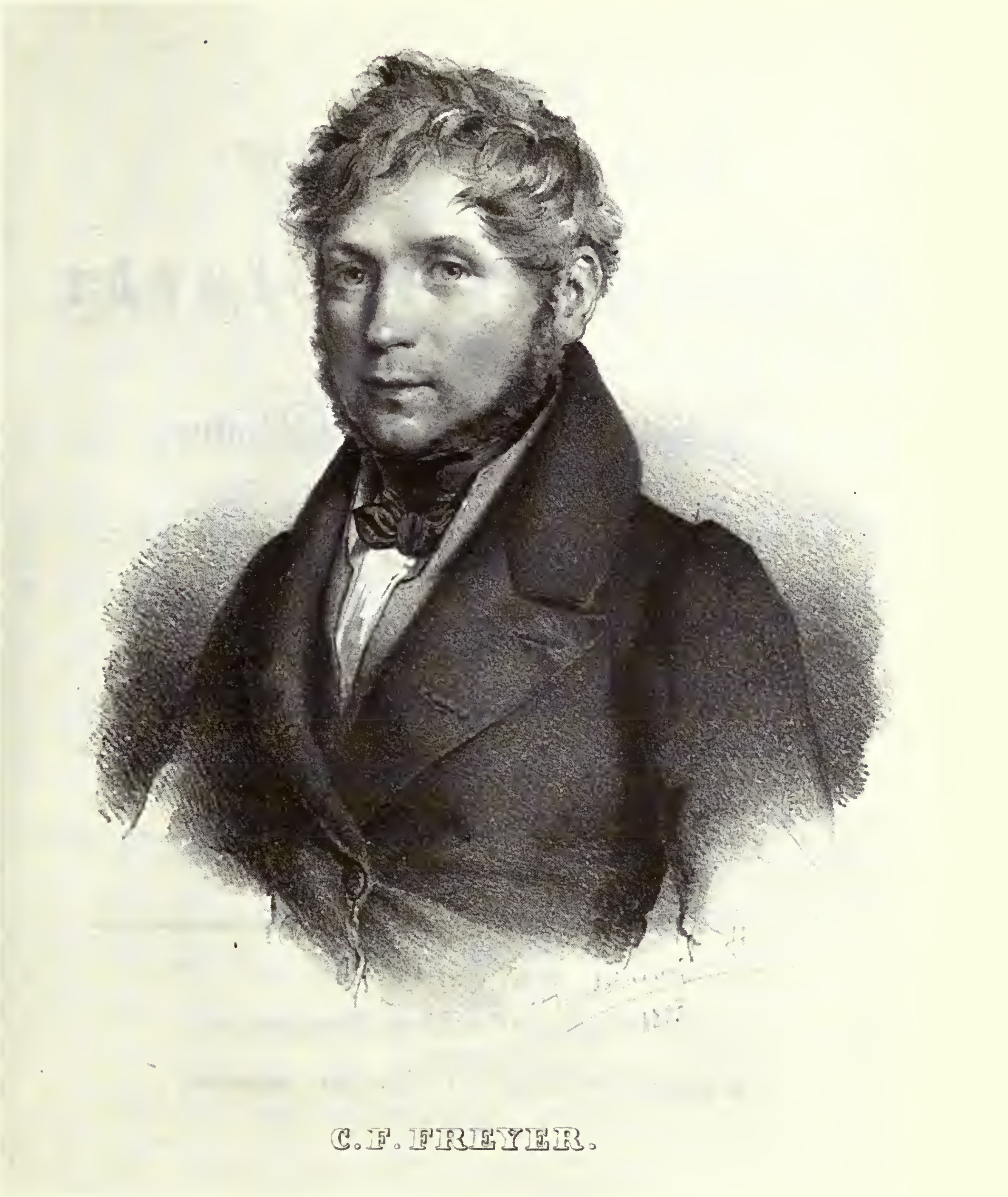
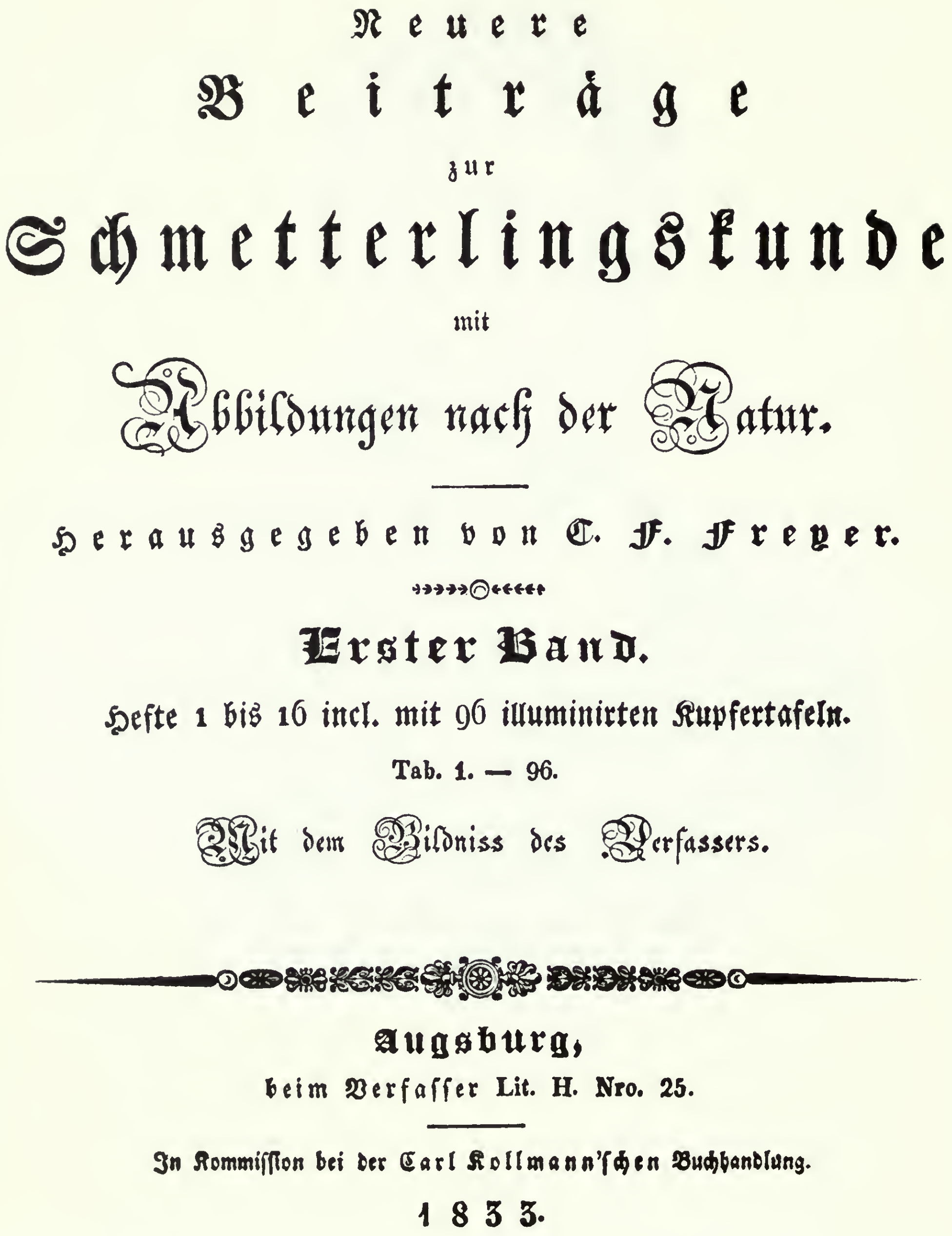


Fig. 1 A portrait of C. F. Freyer which forms the frontispiece to volume 1 of his *Neuere Beiträge zur Schmetterlingskunde.*



Neuere
Beiträge
zur
Schmetterlingskunde
mit
Abbildungen nach der Natur.

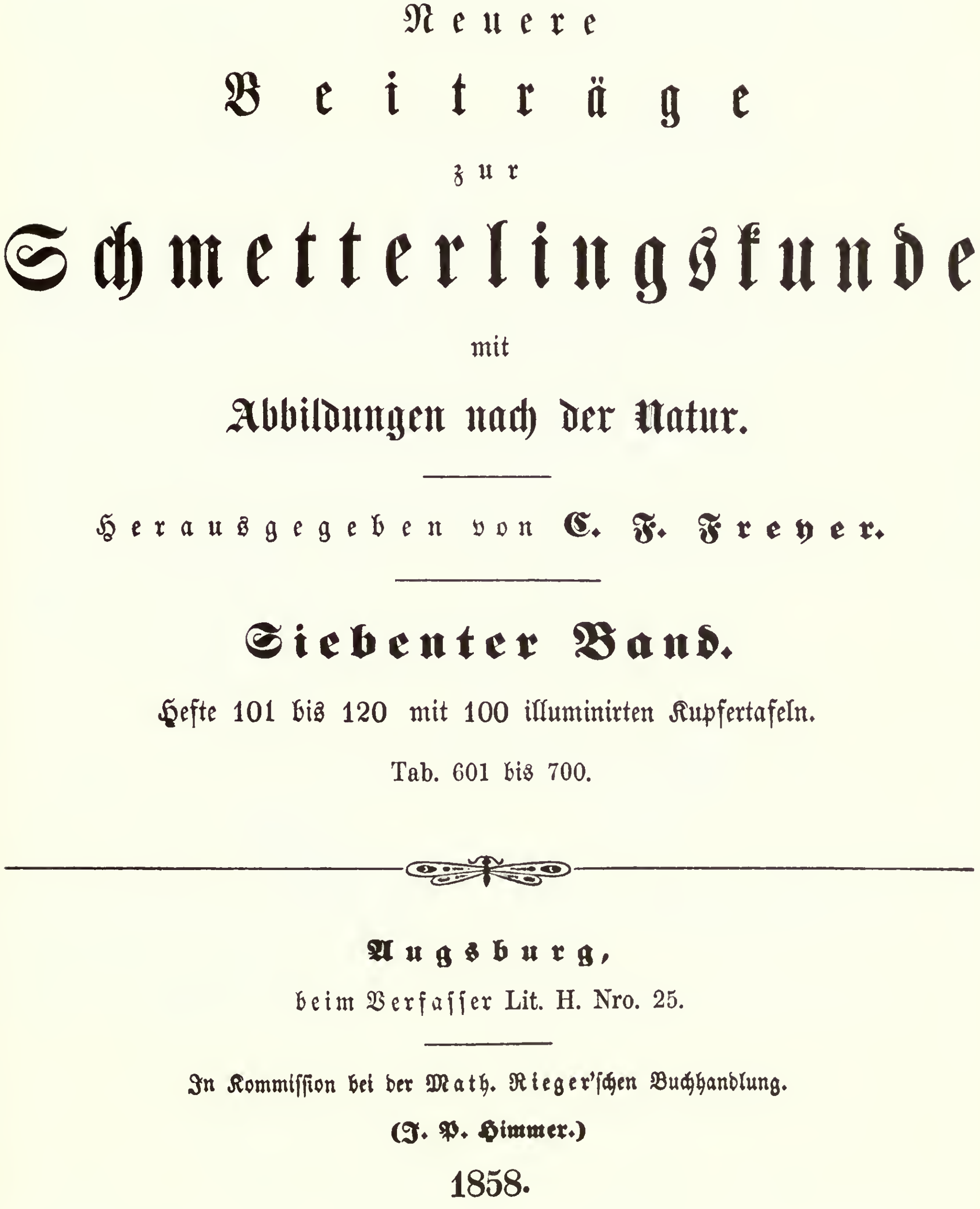
Herausgegeben von C. F. Freyer.

Erster Band.
Hefte 1 bis 16 incl. mit 96 illuminirten Kupfertafeln.
Tab. 1. — 96.
Mit dem Bildniss des Verfassers.

Augsburg,
beim Verfaſſer Lit. H. Nro. 25.

In Kommiſſion bei der Carl Kollmann'ſchen Buchhandlung.
1833.

Fig. 2 The title-page of C. F. Freyer's *Neuere Beiträge zur Schmetterlingskunde*, volume 1.



Neuere
Beiträge
zur
Schmetterlingskunde
mit
Abbildungen nach der Natur.

Herausgegeben von C. F. Freyer.

Siebenter Band.
Hefte 101 bis 120 mit 100 illuminirten Kupfertafeln.
Tab. 601 bis 700.

Augsburg,
beim Verfaſſer Lit. H. Nro. 25.

In Kommiſſion bei der Math. Rieger'ſchen Buchhandlung.
(J. P. Himmer.)
1858.

Fig. 3 The title-page of C. F. Freyer's *Neuere Beiträge zur Schmetterlingskunde*, volume 7.

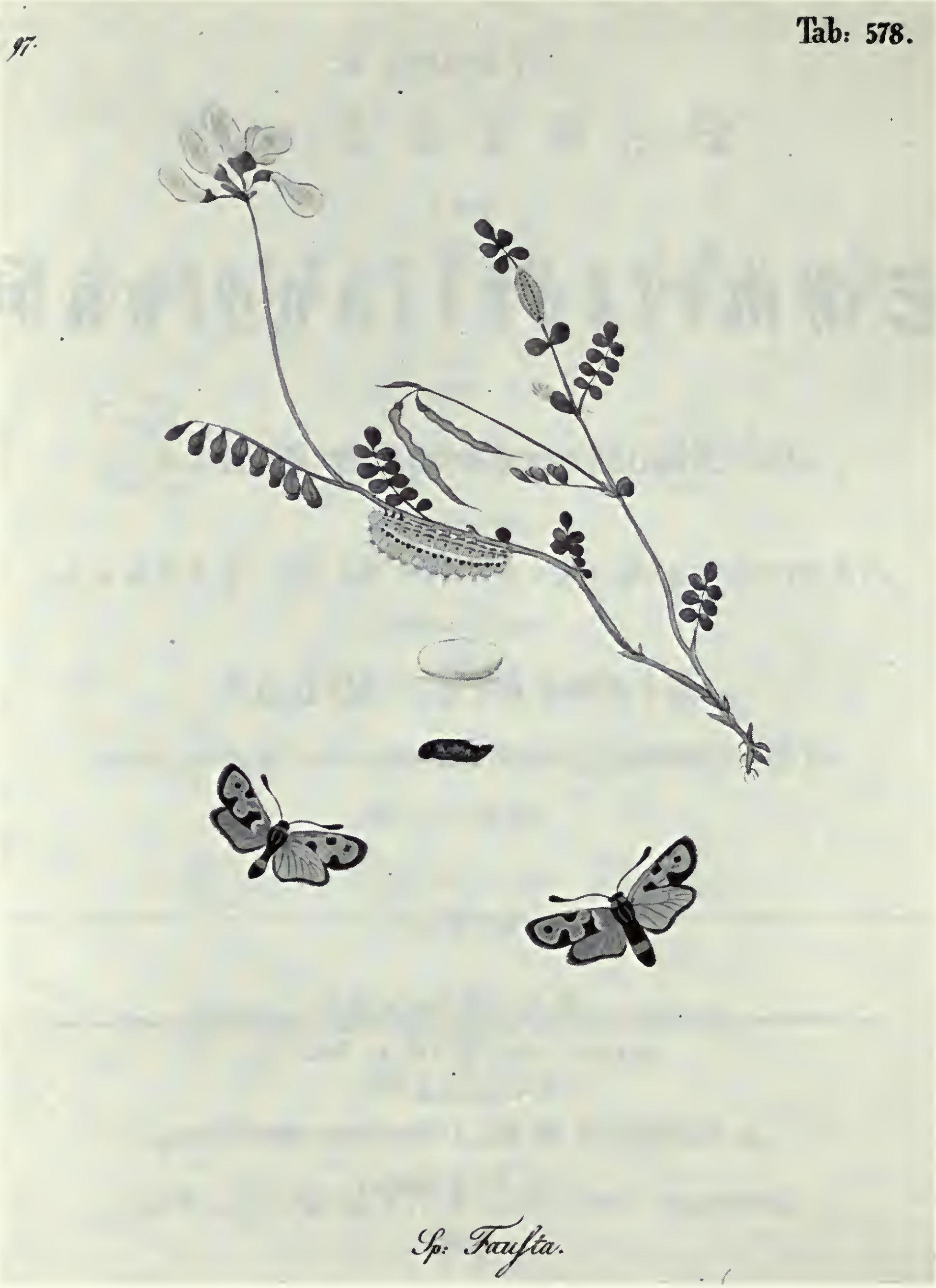
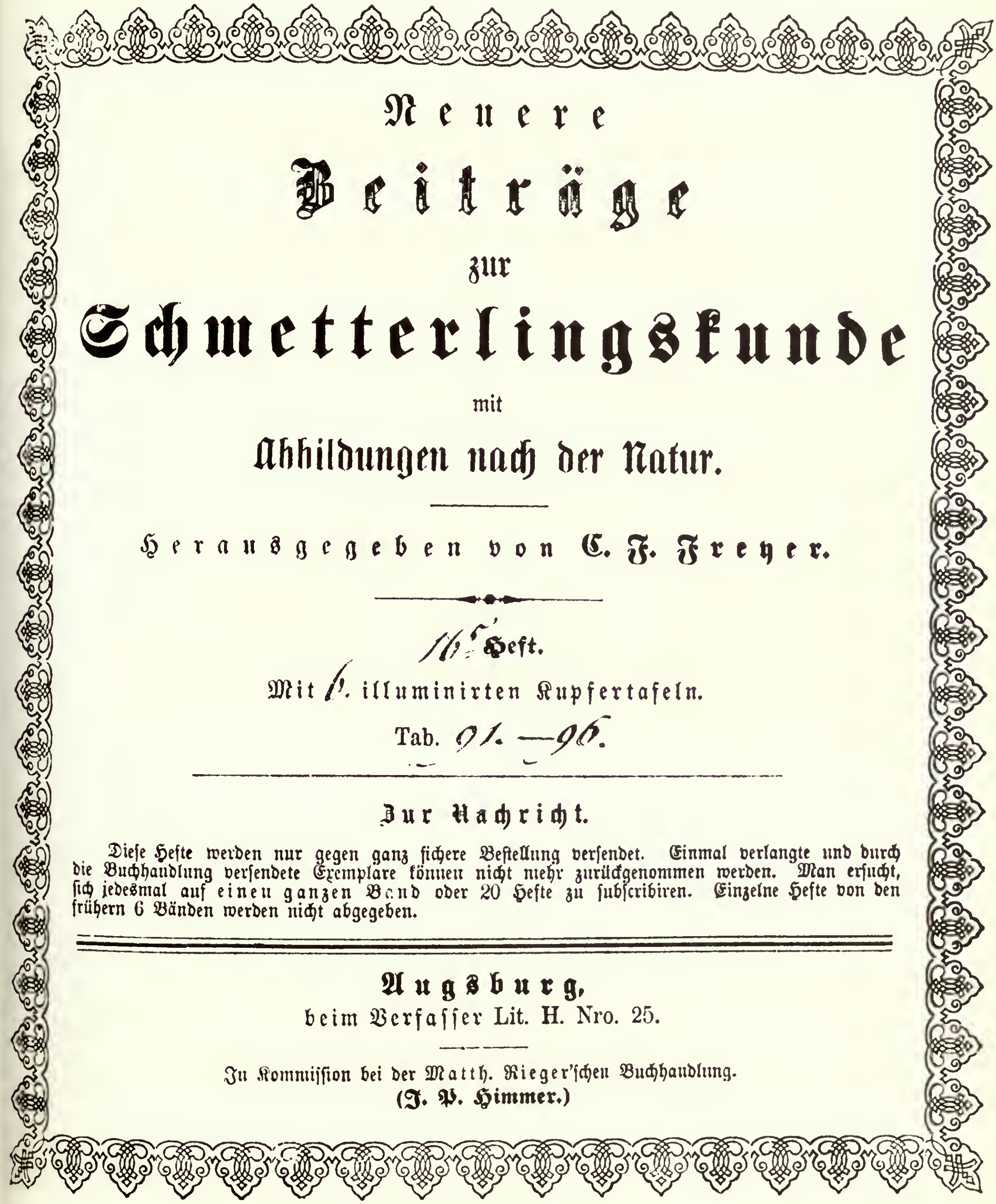

97.
Tab: 578.
Sp: Fausta.

Fig. 4 Plate 578 of C. F. Freyer's *Neuere Beiträge zur Schmetterlingskunde*, volume 6, depicting the adult, early stages and foodplant of *Zygaena fausta* (Linnaeus).



Neuere
Beiträge
zur
Schmetterlingskunde
mit
Abbildungen nach der Natur.

Herausgegeben von C. F. Freyer.

16. Heft.
Mit 6. illuminirten Kupfertafeln.
Tab. 91. — 96.

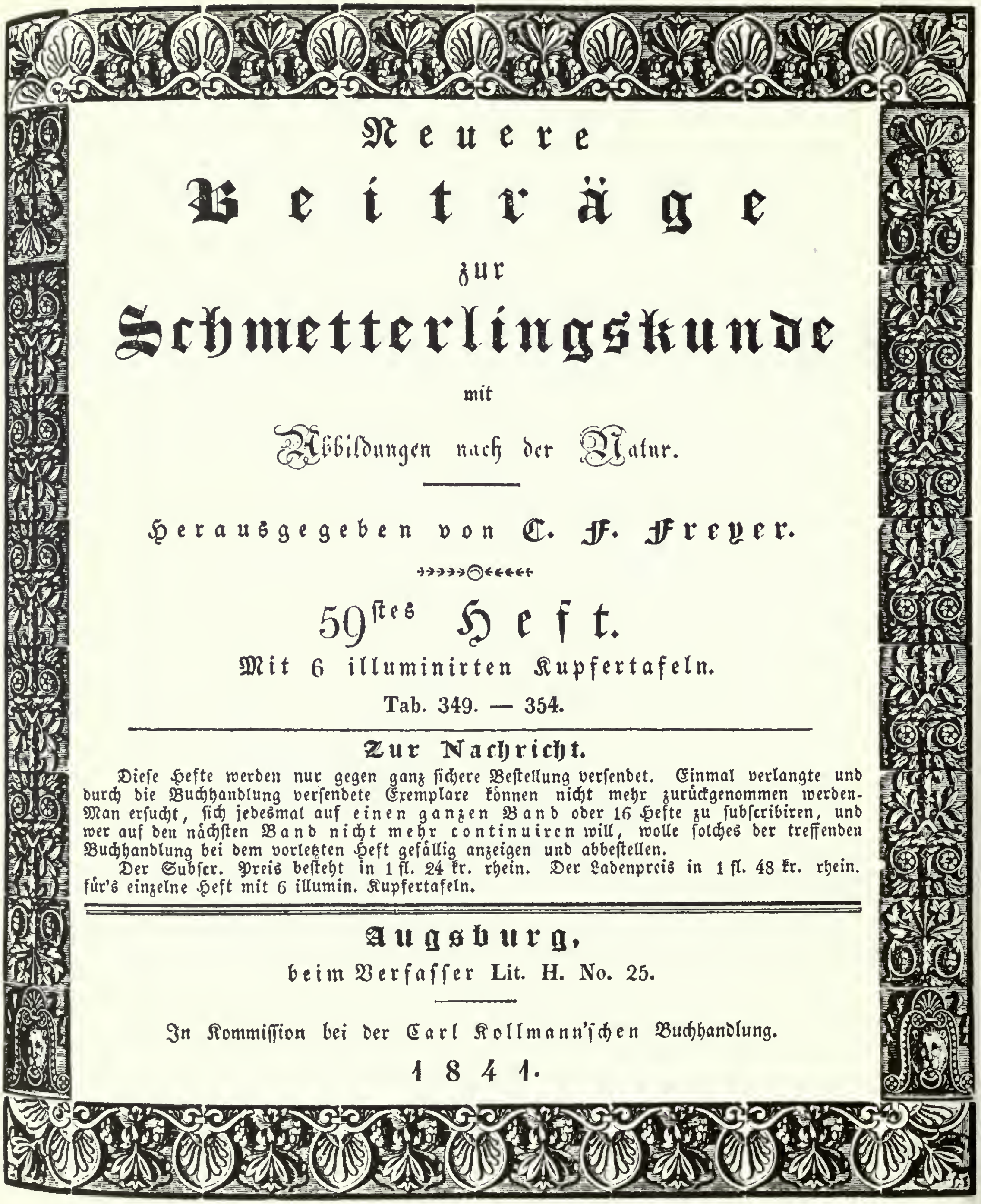
Zur Nachricht.

Dieſe Hefte werden nur gegen ganz ſichere Beſtellung verſendet. Einmal verlangte und durch die Buchhandlung verſendete Exemplare können nicht mehr zurückgenommen werden. Man erſucht, ſich jedesmal auf einen ganzen Band oder 20 Hefte zu ſubſcribiren. Einzelne Hefte von den frühern 6 Bänden werden nicht abgegeben.

Augsburg,
beim Verfaſſer Lit. H. Nro. 25.

In Kommiſſion bei der Matth. Rieger'ſchen Buchhandlung.
(J. P. Himmer.)

Fig. 5 The wrapper of Heft 16 (volume 1, pls 91–96) of C. F. Freyer's *Neuere Beiträge zur Schmetterlingskunde.*



Neuere
Beiträge
zur
Schmetterlingskunde
mit
Abbildungen nach der Natur.

Herausgegeben von C. F. Freyer.

59ſtes Heft.
Mit 6 illuminirten Kupfertafeln.
Tab. 349. — 354.

Zur Nachricht.

Dieſe Hefte werden nur gegen ganz ſichere Beſtellung verſendet. Einmal verlangte und durch die Buchhandlung verſendete Exemplare können nicht mehr zurückgenommen werden. Man erſucht, ſich jedesmal auf einen ganzen Band oder 16 Hefte zu ſubſcribiren, und wer auf den nächſten Band nicht mehr continuiren will, wolle ſolches der treffenden Buchhandlung bei dem vorletzten Heft gefällig anzeigen und abbeſtellen.

Der Subſcr. Preis beſteht in 1 fl. 24 kr. rhein. Der Ladenpreis in 1 fl. 48 kr. rhein. für's einzelne Heft mit 6 illumin. Kupfertafeln.

Augsburg,
beim Verfaſſer Lit. H. No. 25.

In Kommiſſion bei der Carl Kollmann'ſchen Buchhandlung.
1841.

Fig. 6 The wrapper of Heft 59 (volume 4, pls 349–354) of C. F. Freyer's *Neuere Beiträge zur Schmetterlingskunde.*

Ellis & Solander's '*Zoophytes*', 1786: six unpublished plates and other aspects

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Abstract

Ellis & Solander's (1786) *The natural history of many curious and uncommon zoophytes* . . . set a new standard of taxonomic excellence in studies of the 'zoophytes', or animals whose colonies bear a superficial resemblance to plants. The book underpins much subsequent work on hydroids, sea fans, black corals, soft corals, stony corals, some other colony-forming invertebrates, and coralline algae. Several of the intended plates were not published with the work but six of these survive as apparently unique proof-pulls bound in Sir Joseph Banks's copy, held in the British Library. These are reproduced, and modern taxonomic assessment is made of the 22 nominal species depicted. These comprise 15 stony corals, three hydrozoans, two bryozoans and two red algae. In addition some 20 further species depicted on six of the originally issued plates but without captions are identified where possible and taxonomic notes given. This group includes eight stony corals, three sea fans, one hydroid, four bryozoans and three sponges. No type material is designated, but a number of types are recognized.

Several other aspects are discussed in varying detail: the dispersal and subsequent fate of the specimens and collections on which the book was based; the fate of all Ellis's collections, manuscripts and library; the location and identity of the original pencil drawings for the Ellis & Solander book and the identities of the engravers where known; the joint authorship and production of the 1786 book; the lives and work of the two men; and notes on some of their manuscript material and correspondence.

Keywords Sir Joseph Banks, Bibliography, Biography, British Museum, Bryozoa, Cnidaria, Collections, Corals, Coralline algae, Drawings, Jonas Dryander, John Ellis, History of Science, Hydrozoa, Manuscripts, Museums, Portland Catalogue, Scleractinia, Daniel Solander, Stylasterina, Taxonomy, Zoophytes.

Bull. Br. Mus. nat. Hist. (hist. Ser.) **16** (1): 17–87

Issued 28 July 1988

Introduction

From its first publication in 1786 Ellis & Solander's *The natural history of many curious and uncommon zoophytes . . .* became a standard work in many branches of taxonomic zoology and botany, and has remained so for two hundred years. During its preparation Solander was for much of the time employed at the still young British Museum, and Ellis had tables there. The book was one of the first fruits to follow from the establishment of that world-famous institution. A feature of the work was its sixty-three exquisitely-engraved plates. The engravings for further plates had evidently been lost by that time, and only single proof-pulls from just six of them survive. These have long been known in a copy of the book once belonging to Sir Joseph Banks and now preserved in the British Library, but have been almost completely overlooked by taxonomists and bibliographers alike. Their scientific value is considerable. The six are at last reproduced herein (Figs 2–7; see also Fig. 8), and for the first time are taxonomically assessed (p. 27). Some other illustrations perhaps intended for the book survive only as the original pencil drawings (p. 51), but these are not assessed here.

Various other aspects of the work of the two authors are considered, among them the background against which the joint book was produced, the division of authorship within it, the fate of the coral specimens illustrated in the book and of Ellis's manuscripts and other collections, the provenance of the largely extant original drawings for the plates, and taxonomic notes on the several illustrations in the book for which captions were not provided.

Background

Zoophytes: an obsolete concept

At one time there was a widespread belief among naturalists that the several groups of animals forming sessile, branched colonies were actually plants. Such forms were uncritically classified together as 'zoophytes'. At the start of the eighteenth century the term encompassed animal groups as diverse as coralline algae, bryozoans, sponges, and the cnidarian (formerly 'coelenterate') classes today known as scleractinian corals, gorgonians, antipatharians and hydroids.

The grouping together of 'zoophytes' is no longer acceptable in biology but in the context of the present subject the term serves a purpose and we have used it to avoid circumlocution. For a similar reason we have in places used the now restricted generic term *Madrepora* in the original, wide sense to embrace almost all the scleractinian corals, in the way that it was employed by Ellis & Solander (1786) and their contemporaries.

During the eighteenth century zoophytes became better known and group by group their animal nature was revealed. But some authorities were slow to accept these revolutionary findings. A protracted international debate ensued. It was well documented by Johnston (1847; see also Savage, 1948: iv). In common with many others, Johnston considered that it was a London-based amateur naturalist John Ellis who, in the eighteenth century, became the champion of those who rightly considered most 'zoophytes' to be animals.

John Ellis, F.R.S. (?1710–1776)

Ellis's eminence and the international respect he enjoyed resulted from the excellence of his scientific work. Paradoxically, until recently rather little had been written about him. Groner (1987) has recently surveyed many little-known aspects of Ellis's life. For example, he has advanced evidence that the birth date of 1710 is probably correct; but has challenged the traditional view that Ellis was born at an unrecorded place in Ireland, concluding that he was born near London. Rauschenberg (1978*a*, 1978*b*), too, summarized many aspects of Ellis's scientific and non-scientific life. Ellis became a successful and respected merchant and was for some years King's Agent for West Florida and Colonial Agent for Dominica. Groner has given an extended account of these activities. Further biographic information about Ellis is given by Smith (1819, 1821), Stephen (1889), Carruthers (1901), Harmer (1931*a*), Savage (1934, 1948), and Rauschenberg (1978*a*, *b*).

In his zoological activities Ellis covered all the main zoophyte groups but his most detailed work was on the British hydroids. He published numerous scientific papers, mostly in the *Philosophical Transactions of the Royal Society* but also in the *Gentleman's Magazine* and elsewhere. A nearly complete list is available in one of his publications (Ellis & Solander, 1786 – Ellis, 1766, is omitted; see also the bibliography in Ellis, 1767). Among his non-zoological scientific activities were many botanical, agricultural and horticultural projects (Rauschenberg, 1978*a*, *b*; Mackay, 1985; Groner, 1987) and the improvement of the crude microscopes of the day (Rowbury, 1982; Groner, 1987).

His first book (Ellis, 1755) provided the earliest illustrations of some of the zoophyte groups and achieved a descriptive excellence and comprehensiveness which were unparalleled for many years. The illustrations were unusually accurate for the day, and were engraved by leading craftsmen (pp. 51–54). French, Dutch and German translations followed (Ellis, 1756*a*, 1756*b*, 1767), the last being an expanded edition including a useful bibliography of Ellis's works then available and of those of other zoophyte workers.

The 1755 work can be dated accurately. Ellis's own manuscript annotation to the title page of the presentation copy in the Royal Society, London, states 'March 6, 1755', indicating publication at or around that time. A stamp on the reverse states 'Soc. Roy. Lond./ex dono. Auctoris'. Since the dedication at the start of the work was dated 15 December 1754, it seems that publication was swift. Ellis's own copy of the work is preserved in Glasgow University Library (shelf mark Sp. Coll. q 450; P. K. Escreet, pers. comm.).

Some other particular copies can be mentioned. A copy of the French edition (Ellis, 1756*a*) in the Zoology Library of the British Museum (Natural History) [BMNH] (Cnidaria Section, shelf-mark 45E) bears a library book-plate of 'Alex^{r}. Watt', the husband of Ellis's daughter Martha (Dawson, 1958), together with Watt's coat of arms. Martha Watt's great importance in Ellis & Solander's joint book is discussed below (pp. 23, 36, 50). Also in this copy of Ellis, 1756a, is a printed label stating 'Meriel Nevill Watt'; and a third, indicating 'Revd. Alfred Gatty' with his coat of arms. Written on the fly-leaf is 'Margaret Gatty October 1857 for 5/6'. The last-named was an amateur nineteenth century algologist. 'Margaret Gatty, a Yorkshire clergyman's wife . . . wrote a History of British seaweeds' (Barber, 1980: 31). Evidently the copy had a pedigree before coming to the BMNH in 1928. Comments on the previous ownership of a copy of the English edition (Ellis, 1755) preserved in the BMNH were given by Sawyer (1964).

Ellis's work was not without fault. Ironically, he wrongly considered what are today known as coralline algae to be animals (Johansen, 1981: 179). But perhaps an even greater oversight was that he almost totally ignored the important work on *Hydra*, the 'freshwater polyp', which appeared when he was in his early thirties. The pioneer work was published in French by Trembley (eventually appearing in 1744), and almost identical subsequent research was reported by Henry Baker (published more quickly, in 1743). Trembley was mentioned only briefly in Ellis's first book (Ellis, 1755: xvi) and Baker not at all, despite his skilful work. Given that *Hydra* was already widely accepted as animal, and that it was clearly similar to the hydranths or feeding polyps which Ellis had studied closely in hydroids, it is odd that he did not invoke this similarity as a forceful argument for hydroids and hence other zoophytes being animal (p. 47). Ellis (1755: xvi, pl. 28, fig. c) mentioned *Hydra* and illustrated it with a figure so poor and unrepresentative that it would seem probable that he had not seen *Hydra* by this date. However, he later noted (Ellis & Solander, 1786: 10) that he made a thorough examination of specimens in 1770 – when already elderly – and was by then clear about their structure and affinity. Baker was still not cited, perhaps since he was widely, but possibly unfairly, considered to have plagiarized Trembley's work (J. R. Baker, 1952; Lenhoff & Lenhoff, 1985, 1986). There would seem little doubt that the books of Trembley and Baker were readily available to Ellis in London. Trembley's even appeared in the sale catalogue of Ellis's library (Robson, 1786: 62). Although the books of S. Dayrolles were mingled with those of Ellis in the catalogue Dayrolles apparently had no connection with biology (D.N.B.; B.M. Catg. Printed Books) and the Trembley book would most probably have belonged to Ellis. Given that Trembley's impact on biological thought was great, with repercussions quite outside the study of zoophytes, Ellis's omission must be judged a major one. Archinard (1985:

340) felt that 'Ellis, who often mentions Trembley in his book, was greatly influenced by his work with aquatic creatures' but the occurrence of just a single reference to Trembley in Ellis's book (in the introduction) seems to contradict this.

But such oversights as these were unusual in Ellis's work and his subsequent high standing in the scientific community was well deserved. Linnaeus perhaps overstated the case when he remarked that Ellis was 'the main support of natural history in England' and that he had 'derived more information, through [Ellis's] various assistance, than from any other person' (Rauschenberg, 1978*a*: 150; Stearn, 1981: 19). But Ellis was certainly a leading naturalist and was highly talented. He corresponded with some 150 British and foreign naturalists (Savage, 1948; Groner, 1987), a number of contacts which would indicate industry even in today's mechanized world. His correspondents included many of the most senior naturalists of the day.

Some measure of the excellence of his pioneer work on hydroids can be gained from the following. In the tenth edition of the *Systema naturae* (1758) Linnaeus, not being able to read English, based many of his zoophyte species on Ellis's (1755) illustrations (Cornelius, 1979: 309, note 13). Since zoological nomenclature is taken as starting with this edition of the *Systema*, Ellis's illustrations and the specimens from which they were drawn have a considerable importance in the several animal and plant phyla represented. An indication of Ellis's success in defining species is that, of the 26 hydroid species based by Linnaeus almost solely on the illustrations in Ellis's (1755) book, the validity of only one is doubted today. This one is *Sertularia argentea* Linnaeus, 1758 (discussion in Cornelius, 1979; see also Cornelius & Ryland, in press). The question of its validity is still not resolved but Ellis's reputation is undiminished. There can be few eighteenth century naturalists whose species lists are virtually accepted today, and still fewer who at the same time were pioneers in their fields. It may be that in his major research field none has a better record than Ellis.

In addition to advancing these several fields of zoology Ellis was active in horticulture and agriculture, being especially interested in importing plants likely to be of economic use and making similar translocations between certain British colonies. In addition he made refinements to the still primitive single-lens microscopes of his time.

These and many other aspects of Ellis's life and achievements were reviewed by Groner (1987), who provided an extensive bibliography of books, articles and manuscript material.

Ellis died in 1776. Although his daughter, Martha Watt, gave the date as 15 October in the introduction to her father's book (Ellis & Solander, 1786) different dates were given in contemporary publications and Groner (1987), who examined the evidence, concluded that 5 October 1776 was the correct date.

The state of biology in Ellis's England

Ellis's scientific achievements should be evaluated in their contemporary perspective. During his lifetime the study of most fields of terrestrial natural history was, in Britain as in most other countries, still only a little beyond the accumulation of folk-lore; and that of the sea was less advanced still. When Ellis's first book was published in 1755 the inauguration of the British Museum and its famous Department of Natural and Artificial Productions was still a year away. Ellis was about 45, and had already made a great impact on the world of science without the benefit of contact with a learned institution. The British Museum's first 'Under Librarian of Natural History', James Empson (d. 1765), was perhaps the earliest publicly-salaried biologist in Britain, the study of natural history being almost exclusively in the hands of wealthy amateurs at that time. Ellis was evidently among the first amateur scientists to make use of the facilities of the British Museum. The recent and masterly historical account by Carter (1988) has provided a wealth of information on Sir Joseph Banks and his scientific circle in these very early days of the 'BM'; and Groner (1987) has given a detailed analysis of Ellis's place in that embryonic scientific community.

Many of the popular books on natural history produced in the mid-eighteenth century were merely a repetition of country gossip or religious dogma. Gilbert White (1720–1793), author of one of the earliest and most celebrated popular works that were trustworthy (White, 1789), was in 1755 just re-settling in his childhood Selborne. Those of his journals and letters which were subsequently published commence in or soon after 1767 (Windle, in White, 1906; White, 1982) when Ellis was already about 57 and had achieved international fame as a scientist. At this time White was about to join in a debate that went on for some twenty years concerning whether swallows and martins migrated southwards to avoid the British winter or whether they settled in mud at the bottoms of ponds! Such was the state of British natural history. The cultural circle of naturalists, especially in London, must have been small and it was perhaps not just coincidence that one of the eventual publishers of Ellis's second (and posthumous) book (Ellis & Solander, 1786) was Benjamin White, brother of Gilbert and the leading natural history publisher in London at that time (Johnson, in White, 1982: xix, xxxv).

Thus Ellis can be regarded as one of the leading amateur naturalists in mid-eighteenth century England. At this time there were virtually no professionals and his contributions both to the methodology of invertebrate zoology and to its total knowledge were great.

Daniel Carlsson Solander (1733–1782)

In the late 1750s John Ellis, together with another British naturalist, Peter Collinson (1694–1768), had the foresight to ask Linnaeus to nominate an able student to visit England 'for a year or two' to promulgate his binominal system and views on classification (Banks, in Rauschenberg, 1964; Marshall, 1977; Rauschenberg, 1978*a*). Linnaeus recommended Daniel Solander, an unusually capable scholar brought up in Piteå in the far north of Sweden before studying under Linnaeus in Uppsala. A resumé of Solander's years in Sweden has been given by Jonsell (1984). Linnaeus regarded him as one of his most talented students.

Solander based himself in London for many years and fully achieved what was expected of him. He arrived in 1760 and in 1763 took a post at the British Museum. He was charged with cataloguing the natural history collections (Rauschenberg, 1968; Marshall, 1977; Stearn, 1981; Diment & Wheeler, 1984). Later, from 1768 to 1771, he accompanied Sir Joseph Banks (1743–1820) in his capacity as naturalist on James Cook's first circum-global expedition, in H.M.S. *Endeavour*. On returning Solander assumed a second major commitment, of assisting Banks in writing up the results from the enormous collections from this voyage (Marshall, 1977; Stearn, 1984; Wheeler, 1984*b*, 1986), though relatively little appeared in print. During these years Solander was again employed by the British Museum, of which Banks was a leading Trustee, and he was in consequence also one of the first salaried biologists in Britain (Stearn, 1981, 1984; Wheeler, 1984*a*, 1984*b*). Thus, in contrast to Ellis, Solander was for most of his career a full-time, professional naturalist.

Solander was evidently well aware of the dangers that can beset a museum-based naturalist, an awareness perhaps instilled by Linnaeus himself. The following seldom-quoted anecdote conveys a warning still valid for any collection-oriented systematist:

> '. . . when a green living plant was brought to Solander by a lady to be named, he studied it attentively and then said: "Madam, if you shall take this plant home and put it between paper and shall sit upon it for a week, I shall tell you its name.".' [Cole (1895); cited in *Geological Magazine* (1895) 32: 477]

Also in contrast to Ellis, Solander's numerous scientific activities have recently become well documented. Rauschenberg (1968) provided a long account which considered most aspects of Solander's life and work. Summaries of Solander's career after coming to London were given by Marshall (1977, 1984), and of Solander's role during and after the *Endeavour* expedition by Marshall (1977), Wheeler (1984*a*, 1984*b*, 1986), Stearn (1984), Tingbrand (1984), and others whom they cite. Solander's manuscripts have been exhaustively documented by Diment & Wheeler (1984).

The date of Solander's death was 13 May 1782 (Rauschenberg, 1968; H. B. Carter, pers. comm.). Some authors have misquoted it (Banks, in Alströmer, 1785, as 12 March 1782, translated similarly in Rauschenberg, 1964; Marshall, 1984, as 12 May 1782).

The recent scholarly work by Carter (1988) includes a great deal of information about many aspects of Solander's life and work.

The association between Ellis and Solander, and their joint work

At the start of the *Endeavour* expedition in 1768 Banks was 25 years of age, Solander 35 and Ellis, who did not take part, around 58. Their relative ages have some bearing on Ellis & Solander's (1786) subsequent joint publication, a book on zoophytes slightly longer than Ellis's first and rivalling it in excellence.

Ellis had been preparing this second book over many years, starting at least as early as 1765 (letter from Ellis to David Skene, p. 41). The book was in the end posthumous to them both. It, too, can be dated fairly precisely since a copy was presented to the Royal Society on 23 February 1786 (note inside Royal Society copy), implying publication early that year.

Lamouroux (1821) reprinted the 63 Ellis & Solander (1786) plates in his own book. In his preface he modestly stated that his book could be regarded a new edition of theirs, but it has never been so cited.

Before Solander arrived in England Ellis seems not to have had the advantage of a scientific collaborator. Ellis was clearly eager to meet, and the two lunched on Solander's second day in England (Rauschenberg, 1968: 16). They became close colleagues. Indeed, it was the essence of Solander's great contribution to the English scientific scene that he assisted numerous naturalists in their endeavours – often without taking his due credit in authorship (Banks, in Rauschenberg, 1964). With Ellis, as perhaps with others, Solander evidently developed an informal friendship. Thus one letter to Ellis is marred by an enormous ink blot. At the end he wrote:

> 'To acct. for this Curious blot, contemplating on a fine Lady I threw the Ink instead of the Sand on your Letter which you must excuse as I have no time to copy it fair.' [undated; *BL Add MSS* 29–533, f. 39]

Diment & Wheeler (1984) recorded that under this same British Library number are preserved 34 letters from Ellis to Solander written in less than three years from 1760 to 1763. Bearing in mind the paucity of 'biologists' at that time this leaves no doubt that they were intimate friends. Despite their difference in age they made at least one historic field trip to coastal localities in southern England looking at zoophytes (Ellis, 1766; Rauschenberg, 1968: 18; 1978*a*).

A letter from Ellis to Dr David Skene, an Edinburgh physician and prominent naturalist (Lenman & Kenworthy, 1977), indicates the working relationship he had with Solander:

> '. . . I have told Dr Solander that we must sit down and arrange [the zoophytes] properly for him . . . Dr Solander has all this day been busy at the Museum . . . but is to come and spend a day in order to answer your very proper objections to [the classification of] Linnaeus Zoophytes' [25 April 1765, University of Edinburgh Library MS; transcription published in Thomson, 1860.]

Clearly Ellis at this time valued Solander's advice on the then important question of generic divisions within the zoophytes.

The authorship of Ellis & Solander, 1786

Solander undoubtedly had some role in Ellis's second book but its extent has been debated and is discussed further below (p. 36). The title page has led to its being cited as Ellis & Solander, but opinions have differed as to whether one or the other was sole author. Curiously, none of the critics has suggested that they each contributed sections but it seems that they did.

The point is important since both Ellis's books (Ellis, 1755; Ellis & Solander, 1786) have long been regarded as major works. They occupy key positions in the early literature of groups as diverse as algae, sponges, bryozoans, hydroids and various of the anthozoan groups, especially the true or stony corals.

Solander's reputation

Assigning authorship of the different sections of the Ellis & Solander book is interesting also in bibliographic history, since it was the biggest zoological publication in which Solander was named as author. He produced an enormous amount of manuscript material (Rauschenberg, 1968; Wheeler, 1984*a*, 1984*b*, 1986; Diment & Wheeler, 1984; Stearn, 1984) and sustained his fame posthumously through his past and continuing connections with Linnaeus, Banks, Ellis, James Cook and many others. In the context of the times much of his fame was surely justified. But published works by him were few, and in consequence during the nineteenth century his contribution to science was not given great credit (Stearn, 1984). This, and perhaps comments such as those by Banks (Rauschenberg, 1964) and several others on Solander's life style, have led to his reputation being tarnished in some quarters (Rauschenberg, 1968; Marshall, 1977; Wheeler, 1984b).

However, as noted by Rauschenberg (1968) and Wheeler (1984*b*) among others, his poor publication record belied his extraordinary energy, skill and output of manuscripts. Thus Krok (1925, quoted in Rauschenberg, 1968, and in Stearn, 1981) listed no fewer than 66 botanical publications in which Solander's work was included, and Stearn (1981) listed another. Jonsell (1984) even went so far as to say that in quality [some of] Solander's unpublished descriptions 'surpassed those of Linnaeus himself', though in such comparison the sheer magnitude of Linnaeus's output has to be considered.

Solander made the demanding but successful voyage with Banks – a much younger man – and Cook, and remained Banks's closest colleague afterwards (Banks, in Rauschenberg, 1964). Their friendship also withstood a testing voyage to the Hebrides and Iceland in 1772 (Rauschenbrg, 1968). It should be recalled that Banks was one of the foremost cultural figures in Europe at that time, so to remain his close associate over many years, and after the confines of these voyages, was some testimonial.

Solander died unexpectedly when only 49. His surviving manuscripts indicate that given more time he might have produced a work rivalling the *Systema naturae* itself in authority and scope (Whitehead, 1975; Diment & Wheeler, 1984; Stearn, 1984). Solander's critics have themselves been criticized by Rauschenberg (1968), Marshall (1977); Stearn (1981, 1984), Wheeler (1984*a*, 1984*b*, 1986) and Tingbrand (1984) all of whom emphasized Solander's achievements.

Martha Watt, the book's editor

Martha Watt was Ellis's sole surviving offspring. During her short life (27 December 1754 – January 1795) she had several misfortunes, but can be remembered as the person whose industry was responsible for the publication of Ellis & Solander's important book. Her mother died in childbirth when she was four and she was raised by an aunt, but it would seem that John Ellis had contact with her since she subsequently battled to have his book published. She lost her father when she was 22, and was 28 when Solander died. Thus it may well be that during her mid-twenties she was well aware of her father's virtually complete manuscript, with its beautiful and costly plates, lying untouched in Solander's office. On Solander's death she evidently lost no time in getting it published (p. 50). She herself died in childbirth at age 41. Groner (1987, ch. 2, note 59) has provided a more detailed synopsis of her life.

We have not determined whether or not she was the 'Miss Ellis' responsible for Ellis & Solander's (1786) plate 28 (see below, p. 52).

The six unpublished plates

Solander died some six years after Ellis. The manuscript of their book passed to Banks and soon after to Martha Watt who saw it through to publication (p. 50). Many copies of this seminal work survive. All from the published issue known to us have 63 plain, or in some copies coloured, engraved plates. But in Banks's personal copy (British Library 461.1.19), evidently a proof, there are 6 extra plates numbered in manuscript 64–69. In size, style and manner of engraving they are roughly uniform with the others, and with them is a contemporary manuscript page of captions.

The copy seems unique in having these extra plates. We have examined it to determine the species depicted, and have included reproductions of the plates and accompanying manuscript captions herein (Figs 2–8). Students of the several groups covered by the work had been puzzled for years by some of the brief and often vague Latin diagnoses of species assigned by Ellis & Solander to the genus *Madrepora*, which at the time included all the scleractinian corals. Some of these and other taxonomic issues have been resolved from study of the six plates. The analyses of the bryozoan and the alga have been prepared respectively by Miss P. L. Cook and Mrs L. M. Irvine, both of the British Museum (Natural History), and we are grateful to them.

Other aspects

During our work we have collected information on other aspects of Ellis & Solander's book, and have included much of it in supplementary sections. Many of the exquisite drawings from which the plates were engraved are preserved in London. Several other drawings were perhaps also intended for engraving since there is brown transfer powder on their backs, but no reproduction of them is known. We have catalogued some of the drawings (pp. 51–54) and provided notes on what we know of the fate of some other Ellis manuscripts and of his important but largely lost collections (pp. 54–61). The Ellis manuscripts in the Linnean Society, London, are particularly valuable since in the genus *Madrepora* they include much biologically important detail omitted from the book (p. 43). Lastly, we have commented on the identity of several corals and some other zoophytes illustrated in Ellis & Solander's book without captions.

Sir Joseph Banks's copy of Ellis & Solander's *Zoophytes*

Text and plates

The text of the copy (British Library 461.1.19) is identical with that of published copies and has the same pagination. Plates 1–63 are like those of other copies but have minor differences. They are clearly proofs on Whatman paper pulled before lettering. Most of the figure and plate numbers are in manuscript but correspond to the published captions to the plates (Ellis & Solander, 1786: 192–206). Plate 8 (holothurian and pennatulid) is oversize and folded: in published copies it is closely trimmed and unfolded. Plate 36 (*Madrepora virginea*) is duplicated. The first is in an earlier state than in the published version with more of the base of the coral showing and including three additional figures of enlarged details lacking in the issued plate; and there are no plate or figure numbers. The second is as published.

But the most notable features of this apparently unique copy is that it has six extra plates after the normal 63, numbered 64–69 in manuscript (present Figs 2–7). They too are proof pulls. Following them is bound in a sheet with manuscript explanations of all but the last (Fig. 8). The handwriting is not certainly identifiable but comparison with examples of the handwriting of such likely persons as Solander and Dryander (Marshall, 1978) suggests Dryander, who may have compiled the captions from notes of Ellis or Solander when the volume was being assembled. J. B. Marshall kindly examined the explanation sheet and thought Dryander as the likely writer. Like the published edition, Banks's copy has no caption to plate 63.

The earliest printed reference to Banks's copy was by Dryander (1796, **2**: 338) in his catalogue of Banks's library, which was incorporated into the British Museum library (now forming part of the British Library):

> 'In nostro exemplo ectypa etiam adsunt 6 tabularum, quae post mortem auctoris deperditae, in libris editis desiderantur.'

A piece of text showing this lettering, and evidently cut from a copy of Dryander's (1796) *Catalogue*, is pasted to the front endpaper of the Banks copy.

H. Milne Edwards & Jules Haime (1850: 68; 1857, 1: xxii, 2: 107), who in the late 1840s spent some time in the British Museum studying the coral collections, noted the existence of the volume in that institution:

> '. . . six des planches préparées par Ellis furent perdues après sa mort et ne sont connues que par les épreuves avant la lettre accompagnant l'exemplaire de Sir Joseph Banks, qui possède aujourd'hui la bibliothèque du British Museum, à Londres.' (Milne Edwards & Haime, 1857, **1**: xxii)

and

> 'Cet exemplaire [in the BM] renferme les épreuves de six planches qui n'ont pas été publiées et dont on n'a pu retrouver les cuivres après la mort d'Ellis.' (Ibid, **2**: 107, footnote)

We know of no other comment on the timing of the loss of the six engravings, here implicitly – but not certainly – placed between Ellis's death in 1776 and Solander's in 1782 (p. 51). The comments may simply be a paraphrasing and elaboration of Dryander's note. There is evidence that there were other intended plates since some of the original drawings, which still survive in London and of which engravings or prints are not known, nevertheless have brown transfer powder on the reverse (p. 51).

Edwards and Haime also cited one of the plates in the BM copy in their account of *Madrepora mammilaris* (see below, pp. 30–31). But the only other reference to Banks's copy we have found is that in the *Printed Catalogue of the British Library*.

Watermarks

Study of the watermarks of the Banksian copy provides some additional information. The majority of plates have a watermark but most of the text-pages lack one. There are two main types and some subsidiary ones.

The most frequent watermark is a coat-of-arms with a bend (broad diagonal band) on the shield, a complex fleur-de-lis above, and the initials GR below. This occurs in the paper on plates 3, 4, 9, 12–13, 15, 19, 22, 28–30, 33, ?34, 38–41, 44–46, 48, ?51, 52–53, 56 and 60. It is closely similar to that dated 1776, from a 'place unknown', by Heawood (1950: pl. 24, type 158). Heawood associated the maker's-name watermark 'J WHATMAN' with this type, suggesting that James Whatman of Kent, whose name became associated with this kind of paper, supplied this batch. A 'J WHATMAN' watermark occurs on most intermediate plates, viz. plates 2, 5–6, 10–11, 14, 16–18, 20–21, 24–26, 31, 36 (normal version), 42, 47, 57–59, 61–62, 64. Possibly the paper was cut so that the coat-of-arms watermark fell on one side of the cut and 'J WHATMAN' on the other.

A type of watermark similar to the first appears on the flyleaf at the back of the book bearing Dryander's captions (present Fig. 8). But here the initials GR are replaced by a complex looped design. It is thus similar to that recorded from a James Whatman paper by Churchill (1935: cccx, type 415) except that his illustration shows a posthorn on the shield not a bend. That illustration is dated 1784 (Churchill, p. 84). The looped design appears in the watermark recorded from another Whatman paper, dated 1777 (Churchill, type 324). Thus although the paper bearing Dryander's captions is unique within the book it is nonetheless contemporary and from the same manufacturer as the bulk of it.

A more complex design appears in a few places. It comprises a shield bearing a fleur-de-lis with a P in the central arm, an elaborate crown above, a simple geometrical figure below, and below this the initials LVG (pls 43, 54, 65, 67) or VCL (pl. 23). Plate 1 has a similar watermark but its letters are obscured by the printed figure, and plate 49 has the letters, if once present, off the edge of the paper. The LVG design corresponds closely to Churchill's Type 406 (his p. 301), and the VCL one to his Type 407 (p. 302). The LVG design he dated as introduced in 1733, and was apparently in use for many years. The LVG type was mentioned also by Heawood (1950: 105, pl. 254, type 1824) but with a minor difference, and classified as 'England, Kent, 1741'. On plates 7 and 55 the watermark comprises the paper maker's name

I VILLEDRAY. This was linked by Churchill (p. 302, Type 407) to the VCL design. Thus these 8 plates were printed on paper perhaps made some 30–40 years before that of the main batch. Possibly their engravings were among the first to be done (p. 41) and the proofs were stored by Ellis for many years.

Several plates have no watermark, in common with most of the text (pls 8 (oversize), 32, 35, 37, 50). Some others lacking watermarks are on slightly thicker paper than the rest [pls 36 (the oversize copy), 63, 66, 69]. The paper of plate 68 bears just the tip of an unidentified but apparently still further kind of watermark, and that of plate 51 has the watermark obscured.

Lastly, the watermark of plate 27 is unique within the Banks copy. It comprises the initials HR with a cross below and a geometrical figure above, the whole contained within a vertically-orientated oval. We have not identified this watermark.

The surviving proofs of the six extra plates (64–69) unique to the Banksian copy were thus printed on a variety of papers. The paper of plate 64 dates from around the period 1777–1784; that of plates 65 and 67 is probably much earlier, from 1733 on; plates 66 and 69, and also plate 63, which lacked a caption in the published version, are on a thicker paper lacking a watermark; and plate is printed 68 on a paper of normal weight with perhaps yet another watermark type.

The evidence from the watermarks thus shows that the Banks copy was printed on a small range of English papers. Their intermingling suggests that the text and most of the plates were printed within a short period. Though it is possible that some of the plates, being on a slightly different paper, were printed on other occasions we have no evidence whether or not this was so or of the time scale involved.

Binding

The inner endpaper at the front of the volume comprises two sheets with the ‘LVG’ watermark (see previous section) pasted together, implying that the existing binding is contemporary with the printing. The rear endpapers were present in 1978 when we jointly examined the book but since then, around the time that the photographic work was done for the present figures 2–8, they have gone missing. The binding has deteriorated over this period. The boards are now loose and it would seem likely that rebinding might occur. Hence it should be recorded that the lettering piece on the spine reads ‘SOLANDER/ZOOPHYTES’, an interesting wording since the book was written mainly by Solander’s then late friend Ellis (pp. 36–51)! Solander had died some four years before publication, Ellis about ten. Dryander, Banks’s librarian when and after the book was produced, later attributed the book to Ellis alone (p. 38) and would seem unlikely to have put Solander’s name on the spine. Banks had been close to Solander for many years (p. 23) and it would seem plausible that he might have authorized the wording. Possibly he was partly responsible for the incorrect opinion that Solander wrote most of the book (p. 39). In the opinion of E. M. B. King, of the Department of Preservation Services of the British Library, the book was rebacked at an early stage – probably before transfer to the British Museum library in 1827 (the transfer taking place seven years after Banks’s death). It is not clear if the lettering piece is the old one transferred to the new spine or an early replacement, but it is certainly contemporary or nearly so with Banks and his staff. Thus Banks’s influence on the wording would seem likely.

Published copies

Three copies of the published version of the book preserved in the British Museum (Natural History) have slightly differing watermarks, though nearly all of the paper has the ‘GR’ type described above or a variant of it. In these copies the watermarks overlap the centrefolds, so that all are partly concealed with the binding. In the plates of the Banks copy, although the paper on which the text was printed was similar to that in the BMNH copies, nearly all watermarks occur in the centres of the pages or at least away from the edges. A copy in the Cnidaria Section of the Department of Zoology has the text on ‘GR’ paper and the plates lacking any watermark. Another in the Harmer Library, Bryozoa Section, has the text on this paper (excepting pages 97/98, which bear the LVG watermark) while the plates have a variant of the GR design. A third copy, in the Rare Books Room under the care of the Zoology Library, has both text and plates on paper with the GR watermark. In all three copies the plates are on slightly thicker paper than the text. Thus although the normal issue of the book was evidently produced on a range of papers, it is clear that the text and most of the proof pulls of plates in the Banks copy were on 'GR' paper contemporary with the main run.

Conclusion

The Banks copy was, therefore, probably assembled from several proof pulls of plates already made, possibly many years earlier, plus proofs of many other plates pulled around the time the text was printed, together with a set of text pages which were probably not proofs. If the text pages had been proofs they might have borne annotations and corrections but there are none. Hence it would seem likely that the text of the Banks copy was taken from the printing chases as finally set and imposed by the compositor.

The six unpublished plates

This section includes an analysis of the six Ellis & Solander plates newly published here (Figs 2–7) and unique to Banks's copy of the book in which they are numbered 64–69 in manuscript (p. 24).

Our analyses have been written as follows: Miss Patricia L. Cook (PLC), pl. 64 (1–2); Mrs Linda M. Irvine (LMI), pl. 64 (3–4, 7–8); Paul F. S. Cornelius (PFSC), pl. 64 (5–6); John W. Wells (JWW), pls 65–9. The identifications of the specimens illustrated are summarized in Table 1.

The single page of MS captions in Banks's copy is also reproduced here (Fig. 8). As noted (p. 24), the writing is probably by Dryander. It is incomplete, and though it relates to the extra plates it includes no captions for the unpublished plate 69. Banks's copy also has marginal annotations in the text of the book against the account of each species, referring to the illustrations on the six plates, but again plate 69 is not indicated.

Plate 64, Figures 1–2. *Cellaria ternata*

(Present Fig. 2)

Gymnolaemata, Cheilostomata, Scrupocellariidae

Cellaria ternata Ellis & Solander, 1786: 30 [pl. 64, figs 1–2].
Menipea ternata: Hincks, 1880: 38, pl. 6, figs 1–4.
Tricellaria ternata: Ryland & Hayward, 1977: 144, fig. 69.

Part of a colony is illustrated life size in the unpublished plate 64, figure 1, in Banks's copy of Ellis & Solander's book, and shown at an approximate magnification of ×10 in their figure 2. Our reproduction of each is slightly reduced. Their figure 2 clearly shows internodes of three zooids, scuta covering the opesia of some zooids, prominent oral spines, narrow, jointed nodes, and rhizoids. All are characteristic of modern concepts of *Tricellaria ternata*, and since the only other British species today referred to the genus, *T. peachi* (Busk), has many more zooids in each internode, a reduced number of spines and no scuta, the two species cannot be confused.

T. ternata is type species of the genus *Tricellaria* Fleming, 1828, and is currently referred to this genus (Ryland & Hayward, 1977).

Plate 64, Figures 3–4. *Sertularia spicata*

(Present Fig. 2)

Algae, Chlorophyta, Dasycladaceae

Genus *Batophora* J. Agardh, 1854

Batophora oerstedii J. Agardh 1854: 107; Børgesen, 1913: 73–75, figs 58–59; Taylor, 1960: 98, pl. 4, figs 3–4, pl. 5, fig. 4.
Sertularia spicata Ellis & Solander, 1786: 58 [pl. 64, figs 3–4].

Figure 3 on the unpublished plate 64 shows five erect plants of what appears to be a dasycladacean green alga, connected by a stolon. Figure 4 is a stylized magnified drawing of part of an axis bearing whorls of ternate branchlets: some of these are omitted from the drawing, presumably for clarity, but their positions on the axes are indicated. Several of the branchlets are fertile and show clusters of sporangia at the basal nodes. The aggregation of sporangia in this way suggests that the alga illustrated should be referred to the genus *Batophora*, rather than to *Dasycladus* itself. In the latter genus the sporangia are borne singly on the basal cells of the branchlets (Taylor, 1960: 97). *Batophora* also differs from *Dasycladus* in having a naked stipe below, rather than being clothed with branchlets throughout.

The provenance of the original specimen of *S. spicata* was not indicated in the original description. *B. oerstedii* occurs throughout the Caribbean, a region from which many of Ellis's zoophytes were collected.

As far as LMI is aware *Sertularia spicata* Ellis & Solander has not previously been considered an alga, no doubt because the description was difficult to interpret without the accompanying plate. It should be noted that the specific epithet antedates that currently used in the monotypic genus *Batophora* (*B. oerstedii* J. Agardh) by many years.

B. oerstedii is usually described as occurring as single individuals, not with erect shoots connected by a stolon as in the previously unpublished plate 64, figure 3; although Børgesen (1913) illustrated the base of a specimen with many irregular, lobed and ramified rhizoids. Dr M. Nizamuddin, University of El Fatah, Libya (pers. comm. to LMI), commented that his work on the related genus *Udotea* indicates that this feature is not easy to detect and careful field observations are necessary to determine the presence or absence of a stolon.

Plate 64, Figures 5–6. *Sertularia evansi*

(Present Figs 2, 9)

Hydrozoa, Hydroida, Syntheciidae

Genus *Synthecium* Allman, 1872

Sertularia evansi Ellis & Solander, 1786: 58–59 [pl. 64, figs 5–6]; Johnston, 1838: 127.
Dynamena evansi: Lamouroux, 1816: 177; da Costa, 1842: 20–22, pl. 8, fig. 1A, a.
Dynamena tubulosa Heller, 1868: 35, pl. 1, figs 5–6.
Synthecium evansi: Marktanner-Turneretscher, 1890: 248–249 (syn. *Dynamena tubulosa* Heller, 1868); Stechow, 1919: 82; Stechow, 1923: 150; Cornelius, 1980: 7–8.

Stechow (1919) provided additional references.

Figure 5 on previously unpublished plate 64 shows two branched hydrocauli on a substrate which could well be the fucoid indicated in the text; and figure 6 a single, branched hydrocaulus enlarged. Two pencil drawings from which the engravings were prepared are preserved in the Royal College of Surgeons of England (p. 51; Fig. 9). However, the specimen itself is lost (pp. 54–61). Previous comment was provided by Cornelius (1980).

The engraving corresponds closely with the textual description except that the illustrated specimen is infertile. However, the comment in Ellis & Solander that the 'ovaries are lobated, and arise from opposite branches, which proceed from the creeping, adhering tube' would seem to relate not to reproductive structures but either to part of the stolon or to a structure which is not part of the hydroid. The description does not indicate whether these tissues were alive or preserved in spirit. But since they were examined by Ellis after being 'brought from' Great Yarmouth, Norfolk, England, implicitly to London some 140 miles distant, it would seem they were in spirit. The statement that the species 'creeps on fucus's' indicates that Ellis might have removed the stolon from the alga before the drawing was prepared, and subsequently misinterpreted this part of the specimen. Indeed, the unusual reproductive structures found in *Synthecium* were not described until 1868 (by Heller, as *Dynamena tubulosa*) and next only by Broch (1912) without illustration and Leloup (1934); so that Ellis might be excused his wrong interpretation of this part of the specimen. Ellis & Solander stated that the specimen was 'about two inches' (50.8 mm) in height, a dimension in keeping with the size implied by the drawing.

The species was originally assigned to the genus *Sertularia* Linnaeus, 1758, the only suitable genus then available; and later became one of the originally included species in the genus *Dynamena* Lamouroux, 1816. The earliest *published* illustrations of the species were probably those by da Costa (1842), who was the second to record material of it. His identification was remarkable since Ellis & Solander's description was confusing and incomplete, and of course then lacked illustrations; and also because at the time the Italian da Costa wrote *Synthecium evansi* had been nominally recorded only from English coastal waters. *S. evansi* was not included in the original scope of the genus *Synthecium* Allman, 1872, and was first assigned there by Marktanner-Turneretscher (1890) who was also the earliest to regard *Dynamena tubulosa* Heller, 1868, as conspecific.

The Ellis & Solander record was based on the specimen reportedly from Great Yarmouth, Norfolk, England, but the species has not since been reliably recorded north of the Mediterranean Sea. Arguments are roughly balanced as to whether or not the Norfolk record is valid. Ellis obtained the specimen from an East India Company employee, John Evans, who was evidently based at Great Yarmouth, so it could have come from warmer waters by ship (Cornelius, 1980; see also Johnston, 1847: 67, footnote).

Norfolk summer sea temperatures are the warmest around mainland Britain (Garstang, 1901). In certain areas the water is warmed as the incoming tide flows over the extensive intertidal sand flats of the Wash. Some other warm water hydroids have been recorded from the Norfolk area. Thus, *Obelia bidentata* Clarke and *Clytia paulensis* Vanhöffen have been found in this region and from almost no other British localities (Cornelius, 1982). *Sertularella cylindritheca* (Allman) has been tentatively recorded from off Norfolk but not otherwise north of the Strait of Gibraltar, almost paralleling *Synthecium evansi* (W. Vervoort, in Cornelius, 1979: 306). Thus by analogy it is possible that the *S. evansi* locality is valid. It would be odd if it were proved that so large and distinctive a species had otherwise gone undetected along so well worked an area as the English coast of the southern North Sea. But the inshore waters of south-east England were for long poorly worked for hydroids (Hamond, 1957). For example, the much larger and shallower-water *Obelia bidentata* was undetected until the 1950s yet commonly occurs stranded intertidally along this coastline (Hamond, 1957; Cornelius, 1982). Against this background it is difficult at present to determine the validity of the locality of this record of *S. evansi*.

Several authors of faunal lists have regarded the Ellis & Solander record as British without comment (Gmelin, in Linnaeus, 1791; Lamouroux, 1816; de Blainville, 1834; Johnston, 1838, 1847; Gray, 1848; Landsborough, 1852) but none has reported further British material (Cornelius, 1980). Hincks (1868), the main nineteenth century monographer of British thecate hydroids, seems to have been the first reviewer to have omitted the species from the British faunal list.

Plate 64, Figure 7. *Corallina pinnata*

(Present Fig. 2)

Algae, Rhodophyta, Helminthcladiaceae

Genus *Liagora* Lamouroux, 1812.

Liagora pinnata Harvey, 1853: 138, pl. 31B; Taylor, 1960: 329.
Corallina pinnata Ellis & Solander, 1786: 117 [pl. 64, fig. 7].

Figure 7 on the unpublished plate 64 shows a twice pinnate, bushy plant with a percurrent axis. The branches shown are blunt ended and scarcely tapering. These features, together with the comment in the text (Ellis & Solander, 1786: 117) that it was 'covered with a mealy substance', suggest that the plant depicted should be referred to the genus *Liagora*. In fact, the illustration closely resembles *L. pinnata* Harvey, originally described from Sand Key, Florida. The original specimen of *Corallina pinnata* Ellis & Solander had been found on the coast of the Bahamas, whence *L. pinnata* has also been recorded (Taylor, 1960).

Although Ellis & Solander's epithet *pinnata* is much earlier than Harvey's, transfer to the genus *Liagora* would result in an inadmissible combination constituting a later homonym of *L. pinnata* Harvey.

Plate 64, Figure 8. *Corallina loricata*

(Present Fig. 2)

Algae, Rhodophyta, Corallinaceae

Genus *Corallina*

Corallina officinalis Linnaeus, 1758: 805; Ellis & Solander, 1786: 118–119, pl. 23, figs 14–15; Hamel & Lemoine, 1952: 31, pl. 1, fig. 1.
Corallina loricata Ellis & Solander, 1786: 117 [pl. 64, fig. 8].

Figure 8 on the previously unpublished plate 64 is an illustration of a sterile plant typical of the genus *Corallina*. The description given by Ellis (p. 117) states that it was 'much larger than the Coralline of the Shops, being four times as big' and that it was found in the Mediterranean Sea. The 'Coralline of the Shops' was *Corallina officinalis* L. The illustration of it on Ellis & Solander's plate 23, figures 14–15, is certainly of a very small plant or part of a plant but it is otherwise closely similar to that on the previously unpublished plate 64, figure 8. There is no fundamental difference between Ellis & Solander's description of the two. The reference to 'knobs' in *C. officinalis* simply indicates the presence of reproductive conceptacles. There is nothing to suggest that *C. loricata* is anything other than a sterile specimen of *C. officinalis*, a species which is widespread in the Mediterranean (Hamel & Lemoine, 1952) and elsewhere.

Plate 65, Figures 1–2. *Madrepora mammillaris*

(Present Fig. 3)

Anthozoa, Scleractinia, Oculinidae

Genus *Oculina* Lamarck, 1816

Madrepora mammillaris Ellis & Solander, 1786: 154 [pl. 65, figs 1–2].
Madrepora mamillosa Lightfoot, 1786: 98 ('A large and perfect specimen').
Oculina banksi Milne Edwards & Haime, 1850: 68; Milne Edwards & Haime, 1857 (vol. 2): 107 (nom. nov. for *Madrepora mammillaris* Ellis & Solander, 1786).
Oculina valenciennesi Verrill, 1901: 176, pl. 32, fig. 5.
non *Astroites mammillaris* Walch, 1775: 50, (homonym; nom. nov. for 'Héliolithe cylindrique' Guettard, 1770 (vol. 3): 514–515, pl. 54, fig. 3).
non *Madrepora mammillaris*: Wilkens, in Pallas, 1787: 131.

Guettard's 'Héliolithe cylindrique', named *Astroites mammillaris* by Walch and later referred to *Madrepora* by Wilkens, is a fossil coral from the Middle Jurassic near Besançon (Doubs).

Milne Edwards & Haime evidently renamed Ellis & Solander's *M. mammillaris* because of supposed pre-occupation by Walch rather than from a sense of propriety. The type of *O. banksi* is in the BMNH (regd. no. 1834.12.15.3) and is the same species as the coral figured by Ellis & Solander. Pourtalès (1871: 66) suspected that *O. banksi* was the same species as *O. varicosa* (Lesueur, 1821), and Verrill (1901) tentatively included it in *O. valenciennesi* Milne Edwards & Haime. Verril stated that the type of *O. valenciennesi* was probably from the collection of Sir Joseph Banks who may have received it amongst the Bahamian corals Mark Catesby presented to Banks. However, while the type of *banksi* is in the BMNH it is not the specimen figured by Ellis & Solander which was probably Banks's specimen. Verrill was apparently misled by Milne Edwards & Haime's indication '*Madrepora mammillaris* Ellis & Solander Zooph., pl. 65, f. 4 [sic] de l'exemplaire de Joseph Banks' – a reference to Banks's copy of the *Zoophytes* (Ellis & Solander, 1786), with its six extra plates, and not to the specimen.

Plate 65, Figure 3. *Madrepora oculata*

(Present Fig. 3)

Anthozoa, Scleractinia, Oculinidae, Oculininae

Genus *Madrepora* Linnaeus, 1758

Madrepora oculata Linnaeus, 1758: 798; Ellis & Solander, 1786: 154–155 [pl. 65, fig. 3]; Zibrowius, 1980: 36, pl. 13 (*cum syn.*).

The figure on unpublished plate 65, figure 3, is a good representation of a typical specimen of *M. oculata.*

Plate 66, Figures 1–2. *Madrepora erubescens*

(Present Fig. 4)

Hydrozoa, Stylasterina, Stylasteridae

Genus *Stylaster* Gray, 1831

Madrepora erubescens Ellis & Solander, 1786: 156 [pl. 66, figs 1–2].

Stylaster erubescens Pourtalès, 1868: 135 (non Ellis & Solander, 1786, homonym); Pourtalès, 1871: 34, pl. 4, figs 10–11; Boschma, 1957: 8 (*cum syn.*); Cairns, 1983: 142 (*passim*); Cairns, 1986: 58, fig. 26.

By coincidence Pourtalès's *Stylaster erubescens* from the West Indies is evidently the same as Ellis & Solander's nominal species of the same name from St Vincent. Pourtalès gave no reference to the earlier usage by Ellis & Solander, nor has any subsequent author.

The specimen figured on unpublished plate 66 is one of the many corals collected in the West Indies about 1764 by John Greg of Charleston, South Carolina, while serving as secretary to the commissioners sent to dispose of lands in the islands ceded to Great Britain by the treaty ending the French and Indian wars.

Plate 66, Figures 3–4. *Madrepora rosea*

(Present Fig. 4)

Hydrozoa, Stylasterina, Stylasteridae

Genus *Stylaster* Gray, 1831

Madrepora rosea Pallas, 1766: 312; Houttuyn, 1772: 170, pl. 129, fig. 4; Ellis & Solander, 1786: 155 [pl. 66, figs 3–4].

Stylaster rosea (Pallas) Boschma, 1957: 14 (*cum syn.*).

Ellis & Solander's figures of their specimen from St Vincent (W.I.) sent by John Greg resemble very closely the first illustrations by Houttuyn of this West Indian hydrocoral, an illustration regarded by Boschma as typical. Ellis & Solander noted the pink blush of the main branches and white colour of the branchlets.

The 'Rose Madrepore' of Shaw & Nodder (1799: vol. 10, pl. 383), listed as '*Madrepora rosea*' in their index (vol. 24), is not *Stylaster* but *Allopora*, possibly *A. nobilis* Kent of southern African waters; and the primary homonymy needs resolving.

Plate 67, Figure 1. *Madrepora agaricites*

(Present Fig. 5)

Anthozoa, Scleractinia, Agariciidae

Genus *Agaricia* Lamarck, 1801

'Madrepore d'une structure raboteuse' Dezallier, 1755: 367, pl. 22, fig. 7.
'Agaricus seu Fungus quercinus' Seba, 1758: 205, pl. 110, fig. 6cc.
Madrepora agaricites Linnaeus, 1758: 795 (no references or figures indicated); Pallas, 1766: 287 (syn. 'Agaricus seu Fungus . . .' Seba, 1758, *M. agaricites* Linnaeus, 1758); Houttuyn, 1772: 130, pl. 127, fig. 2; Linnaeus, 1775: 683–684, pl. 21, fig. 2 (same plate as Houttuyn); Ellis & Solander, 1786: 159–160 [pl. 67, fig. 1], *non* pl. 63.

The citations above, except for Linnaeus's introduction of the binominal, are to the early illustrations of *Agaricia agaricites*. For further usage see Weisbord's (1974) uncritical synonymy.

Linnaeus, in his original diagnosis of *M. agaricites*, cited no figure. Pallas indicated Seba's good illustration which can be considered the protograph of this well known West Indian hermatypic coral. The specimen figured by Ellis & Solander on the previously unpublished plate 67, with no explanation, is *A. agaricites* forma *danai* (Milne Edwards & Haime, 1860). The specimen illustrated on the published plate 63 by Ellis & Solander, identified as *A. agaricites* by some authors (Lamouroux, 1821; de Blainville, 1830, 1834; Milne Edwards & Haime, 1860; Gregory 1895; *inter alia*), is not *Agaricia* but a species of *Pavona*.

Plate 67, Figure 2. *Madrepora sinuosa*

(Present Fig. 5)

Anthozoa, Scleractinia, Mussidae

Genus *Isophyllia* Milne Edwards & Haime, 1851

?'Meandrites costis amplioribus acutis' Gualtieri, 1742: No. 43 (verso pl. 51).
Madrepora sinuosa Ellis & Solander, 1786: 160–161 [pl. 67, fig. 2]; Gmelin, *in* Linnaeus, 1791: 3761.
Oulophyllia ?spinosa Milne Edwards & Haime, 1848: 239; Milne Edwards & Haime, 1849: 269.
Isophyllia spinosa: Milne Edwards & Haime, 1851: 87, 374; Matthai, 1928: 237, pls 2, 3, 23, 35–39, 55, 57, 61 (*cum syn.*).
Isophyllia sinuosa: Matthai, 1928: 237, pls 2, 3, 23, 35–39, 55, 57, 61 (*cum syn.*); Alloiteau, 1957: 261, text-fig. 184, pl. 12, figs 4–5.

The original description of *M. sinuosa* by Ellis & Solander, published without a figure, was insufficient to permit reliable identification of the species. Esper (1790: 286), in his review of Ellis & Solander's species, considered *M. sinuosa* to be a form of his *M. maeandrites* with broader valleys and shorter meanders in which he included *M. labyrinthica* of Ellis & Solander. However, Esper's figure (pl. 4) shows a coral of the dimensions and growth form of *I. sinuosa* with mussid septal dentations. Quoy & Gaimard's (1833) identification of their *Meandrina sinuosa* from New Ireland with *M. sinuosa* Ellis & Solander was a good but incorrect guess. Milne Edwards & Haime made no reference to Ellis & Solander's *M. sinuosa* although they must have seen the unpublished plate 67 in Banks's copy of the *Zoophytes* at the British Museum along with its accompanying MS captions. Matthai, in his elaborate analysis and iconography of *I. sinuosa*, noted (p. 245) that the type specimen of *I. spinosa*, type-species of the genus *Isophyllia*, could not be found in the Paris Museum. However, Alloiteau, after a long search, found the holotype in the Michelin collection in Paris and figured it.

Figure 2 on the previously unpublished plate 67 is a passable representation of this common West Indian coral, based on a specimen, now presumed lost, from the West Indies collected by John Greg.

Plate 68, Figure 1. *Madrepora spongiosa*

(Present Fig. 6)

Anthozoa, Scleractinia, Acroporidae

Genus *Montipora* Quoy & Gaimard *in* de Blainville, 1830

Madrepora spongiosa Ellis & Solander, 1786: 164, without reference to figure [pl. 68, fig. 1].
Montipora verrucosa Quoy & Gaimard, 1833: 247, pl. 28, fig. 11.
Manopora foveolata Dana, 1846: 507.
Montipora foveolata: Bernard, 1897: 54, pl. 6, fig. 1, pl. 32, fig. 1 (*cum syn.*); Wells, 1954: 434, pl. 146, figs 5–7.

Figure 1 on previously unpublished plate 68 is poor but resembles the textual description indicated in the manuscript explanation (Fig. 8). The infundibuliform (foveolate) deep 'stars' surrounded by obtuse ridges (ambulacra) are typical of *Montipora foveolata* as described and illustrated by Bernard.

The only published use of the combination *M. spongiosa* Ellis & Solander is in Lamarck's (1836: 439) description of his *Porites verrucosa* under which is 'An madrepora spongiosa? Solander & Ellis, no. 49'. *M. spongiosa* (Ehrenberg) Klunzinger and *M. verrucosa* (Lamarck) are both papillate species (*vide* Bernard, 1897: 86, 103).

This coral belongs to Ellis & Solander's group 'Aggregatae' under which they described 24 species, 14 of them figured on the published plates, 5 not figured but identified with earlier figures, and 5 with neither figures nor references. Of these last, one is *Montipora verrucosa* (unpublished plate 69, fig. 1), one is *Montipora spongiosa* (pl. 68, fig. 1), one is *Acropora papillosa* (pl. 68, fig. 5), one, *Madrepora hyades*, has been identified as a *Siderastrea*, and the remaining two, *M. cavata* and *M. bulliens*, from the brief descriptions, are probably species of *Favites*.

Plate 68, Figure 2 (No manuscript caption or text reference)

(Present Fig. 6)

Anthozoa, Scleractinia, Astrocoeniidae

Genus *Stylocoeniella* Yabe & Sugiyama, 1935

[Ellis & Solander, 1786: pl. 68, fig. 2]. (Not included in text, and illustration not included in book.)
Porites armata Ehrenberg, 1834: 119.
Porites astreoides Ehrenberg, 1834: 119 (*non* Lamarck).
Stylophora ehrenbergi Milne Edwards & Haime, 1857: 139.
Stylocoeniella armata: Wells, 1954: 409, pl. 96, figs 1–4 (*cum syn.*); Wells, 1966: 205, fig. 10.

The calices of the small coral illustrated in unpublished plate 68, figure 2, are circular, nearly flush, about 1.5 mm in diameter, slightly separated with suggestions of spinose intercalicular areas, with 12 thick, equal septa the upper margins of which extend about halfway to the calicular axis, dropping steeply to the bottom of the calice where there is a styliform columella. None of the descriptions in Ellis & Solander's 'Aggregatae' fits this coral. Its combination of structures can only be interpreted as those of the astrocoeniid *Stylocoeniella*, an inconspicuous but widespread Indo-Pacific hermatype genus. *S. armata*, first described as *Porites* by Ehrenberg and placed in *Stylophora* by Milne Edwards & Haime, was first illustrated by Klunzinger (1879: pl. 8, fig. 12). The styliform pillars commonly present at the margins of the calices in this genus are not evident in figure 2; but in many specimens they are very small or even absent, as in the example from the Great Barrier Reefs figured by Veron & Pichon (1976:

fig. 50). It is curious that Ellis or Solander had access to a specimen of this species, considered a great rarity for 150 years thereafter.

Plate 68, Figure 3. (No manuscript caption or text reference)

(Present Fig. 6)

The figure is of a ramose, subplicate colony. It lacks any details of corallites, but the growth form and general aspect is that of figure 4 of the previously unpublished plate 69 (*Psammocora contigua* (Esper)), described on page 36, with which it is here associated.

Plate 68, Figure 4. (No manuscript caption or text reference)

(Present Fig. 6)

Anthozoa, Scleractinia, Poritidae

Genus ?*Goniopora* de blainville, 1830

?*Madrepora botryotes* Ellis & Solander, 1786: 172.

The previously unpublished plate 68, figure 4, depicts a clump or tuft of short, blunt branches arising from a worn, vasiform base. Details of the surface of the branches are very poor: suggestions of irregular, slightly separated calices can barely be made out. It might represent one of the 9 species in Ellis & Solander's (1786: 170–173) 'Ramulosae' 6 of which (*damicornis*, *digitata*, *seriata*, *muricata*, *porites*, and *verrucosa*) they figured or referred to earlier-described species and pertain to forms of *Pocillopora*, *Stylophora*, *Seriatopora*, *Acropora*, and *Porites*. The remaining three (*limitata*, *botryotes*, and *granosa*) have not been generically identified. Of these the only one figure 4 might represent is *botryotes*, all too briefly described as having very short, obtuse branches bunched together, and having intercalicular areas (ambulacra) rough and uneven.

Plate 68, Figure 5. *Madrepora papillosa* Ellis & Solander

(Present Fig. 6)

Anthozoa, Scleractinia, Acroporidae

Genus *Acropora* Oken, 1815

Madrepora papillosa Ellis & Solander, 1786: 169 [pl. 68, fig. 5; probably also pl. 69, fig. 3].
Madrepora securis Dana, 1846: 486, pl. 43, fig. 2.
Madrepora cuneata Dana, 1846: 487.
Madrepora plicata Brook, 1891: 465; Brook, 1893: 134, pl. 9, fig. D.
Acropora plicata: Vaughan, 1918: 179, pl. 80, figs 1, 1a, 1b.
Acropora cuneata: Wells, 1954: 429, pl. 100, fig. 3, pl. 131, figs 1–3, pl. 132, fig. 4.

The figure represents a small, very convex or subglobose corallum with two small offsets, covered with crowded, short, thick-walled tubiform corallites about 1.5 mm in diameter. It is a species of the *Acropora* group lacking prominent axial corallites ('*Isopora*') in which Brook (1893) included 5 species: *palifera* Lamarck, *hispida* Brook, *securis* Dana, *cuneata* Dana, and *plicata* Dana. The first two have the inner walls of the corallites very thin or incomplete, whereas the walls of the last three are complete as are those of the figure 5. The differences among the nominal species *cuneata*, *securis*, and *plicata* are trifling and Wells (1954) regarded them a single species under the name *A. cuneata*, of which *Madrepora papillosa* Ellis & Solander is a senior but hardly used synonym. In the brief description of their species Ellis & Solander noted that it was very much like *Madrepora muricata* Linnaeus, and was possibly an early stage of that species.

The previously unpublished plate 69, fig. 3, probably also represents this species (see below).

Plate 69, Figure 1. (No manuscript caption or text reference)

(Present Fig. 7)

Anthozoa, Scleractinia, Acroporidae

Genus *Montipora* Quoy & Gaimard, *in* de Blainville, 1830

Madrepora verrucosa Lamarck, 1816: 271.
Porites verrucosa Lamarck, 1836: 439.
Montipora verrucosa Bernard, 1897: 103, pl. 19, fig. 2 (*cum syn.*); Vaughan, 1907: 160, pls 53–59 (*cum syn.*); Wells, 1954: 438, pl. 143, figs 6, 7, pl. 147, fig. 3.

The rather poor figure with two small enlargements of calices represents a submassive corallum with calices about 1 mm in diameter with 11 thick septa shown on one enlarged calice. On the sides of the calices on the lower left side of the corallum are papillae of the *M. verrucosa* type. These are not shown over the rest of the corallum. This is possibly because the specimen was worn, although many colonies of *M. verrucosa*, especially those from Hawaii, lack papillae over small areas.

M. verrucosa of Quoy & Gaimard (1833) is not that of Lamarck and was renamed *M. foveolata* by Dana.

Plate 69, Figure 2. (No manuscript caption or text reference)

(Present Fig. 7)

Anthozoa, Scleractinia, Faviidae

Genus *Cyphastrea* Milne Edwards & Haime, 1848

Ellis & Solander, 1786: [pl. 69].
Madrepora chalcidicum Forskål, 1775: 136.
Cyphastrea chalcidicum: Veron & Pichon, 1976: 173, figs 342–349 (*cum syn.*).
non *Astroites* Seba, 1758: 208, pl. 112, fig. 18 (=*Porites* sp.).

Figure 2 of the previously unpublished plate 69 is a good representation of a small nodular colony with an enlargement of four calices. These are circular, nearly flush, about 1.5 mm in diameter with 24 slightly alternating septa that are thick marginally and thin internally, most of them extending to a spongy columella. The intercalicular surface is spinose. These are the characters of *C. chalcidicum* as illustrated by Veron & Pichon (1976: fig. 344).

This common Indo-Pacific species, resurrected by Klunzinger in 1879, was also first figured by him (pl. 5, fig. 8, pl. 10, figs 11a–c). None of the three still unplaced species (*nodulosa*, *cavata*, and *bulliens*) of Ellis & Solander's 'Aggregatae' corresponds to this coral. *M. nodulosa*, referred (Ellis & Solander, 1786: 165) to Seba's pl. 112, fig. 18, is probably a *Porites*, and from the short descriptions *M. cavata* and *M. bulliens* seem referrable to *Favites*.

Plate 69, Figure 3. (No manuscript caption or text reference)

(Present Fig. 7)

Anthozoa, Scleractinia, Acroporidae

Genus *Acropora* Oken, 1815

Madrepora papillosa Ellis & Solander, 1786: 169 [pl. 68, fig. 5].
Madrepora cuneata Dana, 1846: 487.
Acropora cuneata: Wells, 1954: 429, pl. 100, fig. 3, pl. 131, figs 1–3, pl. 132, fig. 4.

The figure shows a small corallum with growth form and corallites like those of *M. papillosa*

Ellis & Solander (unpublished plate 68, fig. 5, discussed above). Two enlarged figures of the corallites show them to be tubular with complete, thick walls and 12 septa with primaries reaching the corallite axis.

Plate 69, Figure 4. (No manuscript caption or text reference)

(Present Fig. 7)

Anthozoa, Scleractinia, Thamnasteriidae

Genus *Psammocora* Dana, 1846

Ellis & Solander, 1786: [pl. 68, fig. 4]
Madrepora contigua Esper, 1795: 81, pl. 66, figs 1–4.
Psammocora contigua Veron & Pichon, 1976: 22, figs 13–22 (*cum syn.*).

Figure 4 on the previously unpublished plate 69 shows a ramose, subplicate corallum suggesting *Psammocora*, and the small enlargement of the surface reveals the characteristic petaloid aspect of the large septa – a detail that confirms that it is *Psammocora*. No description remotely suggesting this coral can be found among those species lacking figures or references in Ellis & Solander's text. The first description of the species was by Esper (1795). Veron & Pichon included under *P. contigua* four, possibly six, other ramose nominal 'species'.

The preparation, production and authorship of Ellis & Solander's *Zoophytes* (1786)

Ellis died in 1776 and Solander in 1782, and their book was posthumous to them both. Many contradictory published comments have left doubt about who was responsible for the final text. The question is important since the book provided a foundation for much subsequent work on cnidarians, sponges, bryozoans and coralline and other calcified algae (see Introduction). Though the book has usually been ascribed solely to Ellis, a few commentators have stated or implied that Solander wrote it. In fact, it seems that Ellis wrote most of it and Solander a little. Curiously, this view has not been advanced before.

Much of the published and manuscript material pertaining to the question of authorship also provides information on how the book came to have its final scope, and in part on where and when it was written and edited. The sources for these different categories of information are often the same, and the two aspects of authorship and production are treated together to avoid undue repetition of source material.

The book is unusual in lacking an introductory section. After a brief preface by the editor, it starts straight in with the account of the first genus treated. This is in contrast to Ellis's (1755) first book which has a lengthy introduction.

Title page and introductory advertisement

Both the title page and the introductory advertisement to the book included ambiguities and contradictions that need resolving. The absence of punctuation at the end of the fifth line of the title (Fig. 1) might be taken to indicate that Ellis himself collected all the material described in the book, while introducing a full stop or comma would change the sense to imply that Ellis just described the specimens and did not necessarily collect them. In fact both authors collected some of the material, Solander for example bringing many of the true corals (*Madrepora*) back on the *Endeavour* (p. 57); but probably most of the specimens described came from the collections of others (pp. 54–61).

The presence of a large capital initial at the start of line six, implicitly starting a new sentence, supports the interpretation that Ellis wrote all the text. However, lower down the page it is stated that the species in the book were 'systematically arranged and described' by Solander. But, again in contrast, the book's subsequent editor Martha Watt, who was Ellis's daughter, stated on page vi of the introductory advertisement that (only) 'the arrangement of the descriptions' was done by Solander, implying that Ellis had actually written them. On the same page she stated that Ellis alone was responsible for having the plates both drawn and engraved. Probably neither of her statements is entirely correct, nor did Ellis write all the text.

Strangely, her assertion (Ellis & Solander, 1786: vi) that Ellis had 'proceeded no farther than the completion of [the] plates' before he died also seems incorrect since there is overwhelming evidence that in fact Ellis had by this time written most of the text! Indeed, she implied as much on the same page by stating that Solander just *arranged* the descriptions. Again in contrast, in the dedication of the book (to Banks), Ellis alone is indicated and Solander's name does not appear.

It may be that Martha Watt did not intend that a detailed analysis should be made of her dedication and introductory advertisement, but the above inconsistencies and some others require explanation. Thus she stated (Ellis & Solander, 1786: vi) that the book was 'published at the request of Sir Joseph Banks, Bart. P.R.S.'. Yet a surviving letter (p. 47) from Mrs Watt to Banks suggests that it was *her* initiative that led to its publication some four years after Solander's death and ten years after her father's. There seems no reliable evidence that during these ten years Banks or his assistant Solander worked on the book at all. The evidence we offer below shows that had it been published in 1776, when Ellis died, it would have been virtually the same book. Banks and Solander had apparently left it untouched, and in view of its scientific excellence one might ask why.

In 1786 Banks was already President of the Royal Society and was undoubtedly a central figure on the British and European scientific scene. Martha Watt was in contrast merely the daughter of an amateur who had been dead nearly ten years. Solander was Banks's closest colleague (Banks, in Rauschenberg, 1964). The text of the book would possibly have been shown to Banks, who might well have read at least the introductory advertisement. It could be that Banks's unwitting influence resulted in Martha Watt incorporating the implication that Solander was greatly involved in authorship. Indeed, it seems that he did write a small yet important part, that written at the British Museum (p. 44). Ellis also worked there (p. 44) and Banks would have had ample opportunity to discuss Ellis's work and to realize that Ellis had prepared an extensive manuscript. Later, others also gained the impression that Solander was its author (pp. 37–39).

It would seem plausible that there was genuine misunderstanding of Solander's role. Ellis was long since dead, and had been sickly towards the end of his life (p. 50); but Solander had still been active when Ellis died, being only about 43 years of age. He had undoubtedly helped Ellis in his later years, especially at the BM where Banks would have known that Solander had worked on the section he actually wrote (p. 39). Ellis, meanwhile, had a full professional life of his own (reviewed by Groner, 1987, and by others whom he cites) and might have appeared only occasionally at the Museum. Indeed, even within London there was much communication between Ellis and Solander by letter. Hence it might be argued that Ellis's major contribution to the book could have been overlooked by Banks (p. 39). Solander could have unwittingly given the impression that he was himself responsible for more of the book than he was, simply by working on it where he did. Apparently he worked on the *Madrepora* section for only about three weeks (p. 44), but perhaps that was enough to give the impression that he was more deeply involved with Ellis's book than he was.

Thus the statements at the start of the book are contradictory. Some of the evidence which is analysed below is equivocal even when the sources seem authoritative. Yet the overall implications of the title page and of the introductory advertisement, written by Ellis's daughter, that Ellis was largely responsible for the book, seem in the end correct.

Contemporary comment

Remarks in the *Dictionary of National Biography* by Boulger (in Lee, 1898) and elsewhere by Rauschenberg (1968) suggest that Solander alone wrote the book. But neither author considered contemporary comments which, apart from the ambiguities of Martha Watt's introduction, indicate Ellis alone. Thus Lightfoot (1786), when referring to the book, used the abbreviation 'Ellis Zooph.' some 27 times, and 'E&S' 16 times, clearly implying a major involvement by Ellis.

The work attributed to Lightfoot (1786) was the extensive sale catalogue of the Duchess of Portland's collections, known as the *Portland Catalogue*. It included many zoophytes. Lightfoot was one of the Duchess of Portland's curators (Pennant, 1789: preface) and would certainly have been well placed to have compiled it. Slightly earlier Solander also curated her collections, and for part of the 1770s visited her one day each week (Banks, in Rauschenberg, 1964; Rauschenberg, 1968). Thus Lightfoot could well have known about the authorship of the Ellis & Solander work. It happens that authorship of the work ascribed to Lightfoot (1786) has itself been debated (Dance, 1962; Clench, 1964; Kay, 1965; Rehder, 1967; other references in Wheeler, 1984*a*, 1984*b*), undermining the authority of the comment attributed to Lightfoot. But Banks (in Rauschenberg, 1964) implied that Lightfoot was indeed the author, and in addition that the zoophyte entries in the work ascribed to Lightfoot were drafted by Solander.

Lettsom (1786: 54), writing of John Fothergill's important coral collection, said '[Fothergill's] corals, from whence Ellis . . . delineated his system, and created a new species . . .', and did not even mention Solander.

Similarly Dryander (1796, **2**: 338), Banks's librarian, ascribed the book to Ellis alone and did not mention Solander's name in his catalogue entry. Dryander was successor to Solander's post. He must have had frequent opportunity to become well aware of which of the nominal authors was responsible for writing the text. It seems virtually certain that conversation about the writing of such a major work, with its expensive plates, would have taken place occasionally between Banks, Dryander, Solander, and Ellis – though not necessarily together. And yet it seems that Dryander was incorrect in ascribing the book entirely to Ellis.

Two contemporary book reviews offered some views on authorship. The first (Anon. 1, 1786) indicated Ellis as sole author, Solander's contribution being only to 'arrange' the work – the word perhaps being taken from the title page. Concerning the treatment of the genus *Madrepora*, the author of the review commented (p. 5): 'The madrepora is generally described; but here we begin to lose our author's [Ellis's] assistance . . .', a comment on the less detailed treatment in that section. This is the section apparently written by Solander (p. 44).

The second book review (Anon. 2, 1786) was still more explicit. It stated that Solander's contribution was to 'introduce system, that vital principle of all researches', implying in this context that Solander grouped the species according to the Linnean system. This may be what was meant on the title page and in the introductory section by the use of the word 'arranged'. Indeed, contemporary dictionaries suggest that the word implied 'putting into a definite and logical order' rather than the present-day meaning which tends towards simply 'putting in the sequence observed'. The review continued: 'At the same time, [Solander] has added such new objects as have been discovered since Mr Ellis's [1755] publication, either by himself, or by others . . .', but this is hardly true since it seems that most of the non-coral text and related plates of the 1786 work were prepared by Ellis – albeit possibly with occasional help from Solander.

Thus the strong implication from this review is that Solander's contribution was to *arrange* the species and genera along the lines of the Linnean system, with genera and higher taxa logically ordered, and to add descriptions of material additional to that which Ellis knew. This may well be so: and would explain the origin of some manuscript notes extant in the Linnean Society of London (p. 43), written (albeit in Ellis's hand) at least 10 years before the book was published, delimiting the genera and defining some of them. The notes suggest that Solander early on showed Ellis how to adopt a Linnean-style classification, lacking in Ellis's first book (see also the Ellis letters to David Skene, p. 41). Indeed, this is why Solander had been asked to come to London – to promulgate Linnaeus's views on classification; and Ellis had been among those responsible for inviting him (p. 21) and clearly welcomed his input. Nevertheless, despite the implications of the second review, there is no evidence that Solander did any of the writing outside the important *Madrepora* section.

Curiously, contemporary comment on the book made no direct reference to this major contribution by Solander. This might suggest that neither of these two anonymous reviewers, or the other authors mentioned (Dryander, Lettsom, Lightfoot), had really detailed knowledge of the authorship. They were perhaps writing partly from heresay, and it should be remembered that the book was posthumous to both authors. Neither of the two who knew both authors well and who lived to see the book published, Banks and his assistant Dryander, implied or mentioned contributions from Solander.

Solander's obituary by Sir Joseph Banks, written in 1784 (published in Swedish by Alströmer, 1785, and in English by Rauschenberg, 1964), points to a similar conclusion. It serves as an obituary of Solander. Banks knew Solander extremely well. He greatly praised Solander's work and mentioned his friendship and scientific cooperation with Ellis but, notably, did not mention the Ellis & Solander book. The book was already in advanced manuscript in 1784, and at that time it could even have been with the printer since a copy was presented to the Royal Society in London on 23 February 1786 (note inside Royal Society copy). Its introductory advertisement confirms that Banks was well aware of it. So its omission from the obituary by Banks is noteworthy, especially since the book became the biggest published zoological work with which Solander's name is associated as author and almost certainly included descriptions of many corals which Solander and perhaps also Banks had collected on their epic voyage with James Cook. Banks mentioned several works in which Solander had been deeply involved and his lack of comment on the then unpublished Ellis & Solander book might simply have reflected the minor role Solander had had in it. There were many other works by Solander worthy of inclusion to comment on. If, as is deduced below, Solander's contribution to the book was 'just' the bulk of the *Madrepora* descriptions then Banks might have considered it too small an item to include. Indeed, it seems that Solander wrote the *Madrepora* descriptions briskly, in less than three weeks (p. 44): and Banks was commenting on more than twenty years of energetic scholarship. The evidence for considering that Solander helped Ellis to some extent in preparing some of the illustrations may also be valid. But even so, this too might not have ranked high enough in Banks's estimation to warrant inclusion in the letter. Still, the omission is bibliographically misleading and with hindsight it can be regarded an unfortunate error by Banks.

Thus there seems no support from contemporary published evidence for the contentions of Boulger (in Lee, 1898) and Rauschenberg (1968) that Solander wrote the book.

A confusing note by Stoever (1794, p. 300) implies that Solander handled proof pulls of some of the plates:

> 'In 1771, the father of Linnaeus [Jr] complained that he had not heard of Solander for several years, yet he had done so much for him as [for] any one of his pupils. He rejoiced, however, at seeing the new edition of Ellis's *Essay on corallines*, published under the auspices of Solander, who sent him some of the proof-plates.'

The 'new edition' referred to would probably have been the much amended German edition of Ellis's first book (Ellis, 1755, translated into German as Ellis, 1767). No involvement by Solander is mentioned in its detailed introductory passages, but although it may seem that Stoever was mistaken in this it remains plausible that Solander handled some aspects of the book's publication. The proof pulls which Solander is said to have sent to Linnaeus [Sr] would have been from the 1786 joint work. In or soon after 1771 Solander had some of the scleractinian coral (*Madrepora*) engravings prepared (p. 40), under Ellis's supervision to an unknown extent, and it would seem likely to have been these which Solander would have proudly sent to Linnaeus. They probably depicted specimens collected by Solander on the *Endeavour* and passed to the collector John Fothergill who evidently returned them to the BM for Solander and Ellis to work on (p. 43). Though Stoever's passage is confused and hence suspect it does provide some corroboration that Solander started to supervise these engravings, which became incorporated into the book, in 1771 soon after his return from the voyage of the *Endeavour*.

Later published opinions

Lamouroux (1821), in his introduction, stated that Ellis wrote the descriptions and that Solander only corrected them ('Les descriptions faites par Ellis et corrigées par Solander . . .'). Although he might simply have been quoting Martha Watt it seems he could have had near-contemporary knowledge since he or his publisher had obtained most or all of the copper engravings of the 63 plates from the book as published and he may well have learnt something about its history. He could have heard directly from Banks. Lamouroux died in 1825, at the relatively early age of 45 (Redier, 1967), and had little opportunity for further comment. We have not attempted to locate any relevant correspondence of Lamouroux or others involved in the production of his book.

Similarly, Milne Edwards & Haime (1857: xxii) considered Ellis the sole author:

> 'Ce livre . . . porte les noms d'Ellis et de Solander, comme si ce dernier avait réellement contribué à sa rédaction; mais il est évident qu'il est dû tout entier à Ellis.'

This is an assertion that Solander was not involved. But the new evidence we have examined suggests that he was. Although Milne Edwards and Haime visited the BM and might have obtained evidence for their view they were writing long after the book's appearance, and their published opinion has to be treated cautiously. Paradoxically, they overlooked Solander's important contribution to the section on scleractinian corals (*Madrepora*) which was their main interest in the work.

In contrast, Boulger (in Lee, 1898, article on Solander) recorded that Solander 'arranged and described [all] the material for John Ellis's *Natural History of Zoophytes* (1786)', but he was not so close to the events as Dryander, Lamouroux and Lettsom, and was perhaps simply repeating what might be inferred from the title page.

Concerning the illustrations, Rauschenberg (1968: 19) pointed out that Ellis had asked Solander to 'supervise the production of the illustrations for publication' of an article on hydroids in the *Philosophical Transactions of the Royal Society* as early as 1762, some fourteen years before Ellis's death; and Solander is known to have supervised some of those used in the book (p. 39). In a letter to Borlase, written in 1764, Ellis stated that 'Solander [was] to describe those plants' on which Ellis was working at that time (Rauschenberg, 1968: 24). Similarly, Sir Joseph Banks wrote in 1784 – two years after Solander's death – concerning a joint botanical work by Banks and Solander, that there was 'hardly a clause written in it . . . in which [Solander] had not shared' (Banks, in Rauschenberg, 1968: 43), adding weight to the general opinion that although Solander only infrequently published under his own name, he made major contributions to the scientific writing of others. Rauschenberg (1968: 54) considered that 'John Ellis was the person whom Solander aided the most . . . Solander wrote the descriptions for Ellis's book on Zoophytes'. However, although Solander might have helped Ellis with the text, Rauschenberg gave no evidence that Solander was author of all the descriptions and seems almost entirely misled on the question of authorship.

Several of the biographies about Ellis or accounts of his work (Smith, 1819, 1821; Stephen, 1889; Carruthers, 1901; Harmer, 1931*a*; Savage, 1934, 1948) have failed to touch upon the question of authorship of the book. A note published to commemorate the birth of Solander (Anon. 4, 1936) mentioned his involvement with the work but similarly gave no detailed information about who wrote what.

Rauschenberg (1978*a*: 15), citing pages v–vii of the book (Ellis & Solander, 1786), later commented that after Ellis's death Solander had given 'aid on taxonomic matters' to Ellis's daughter during production of the book, and that John Fothergill and later Sir Joseph Banks had helped financially with it. However, in the book itself (Ellis & Solander, 1786: vi) it is stated that Fothergill paid for some of the engravings and that they were done under *Ellis's* supervision and, therefore, during Ellis's lifetime. Though Banks is discussed there is no statement that he helped financially, although Fothergill's generosity is mentioned. It seems that Rauschenberg was partly wrong.

The wide-ranging accounts by Wheeler (1984*a*, 1984*b*) noted that Solander was involved with the coral section and repeated the statement in Martha Watt's preface to the book that (only) the 'arrangement of the descriptions' was due to Solander. Wheeler aptly cited our view that 'some of the credit' for the importance of the book in subsequent invertebrate taxonomy 'must lie with Solander who from their correspondence and from the text of the book clearly made a significant contribution to the work'. Our analysis corroborates this view.

Manuscripts and letters

Some evidence on authorship exists amongst the extensive manuscript material pertaining to Ellis & Solander's book. It is preserved mainly in the archives of the Linnean Society of London and was recorded briefly by Savage (1948: 92, item 14; also p. 50, 'Daniel Solander, eight letters'). Recently it was mentioned by Wheeler (1984*a*, 1984*b*) and catalogued by Diment & Wheeler (1984). Some of the letters have been published in a variety of places. The manuscripts are incomplete and do not include more than a few of the published species descriptions. Nevertheless, there are several pages in Ellis's hand of drafts for the introductions to the genera *Sertularia, Antipathes, Gorgonia, Millepora* and *Madrepora*, as well as several *Madrepora* species descriptions which, however, were not eventually published (see next section). Thus it is clear that Ellis was very much involved in the early drafting of at least these sections. Unfortunately, the authorship of the published species descriptions in any of the genera cannot be deduced from this material save that in most of the *Madrepora* species it was evident that they were *not* based on these notes and, therefore, were implicitly not due to Ellis.

In the late 1760s Ellis evidently considered himself to be sole author. Thus, he wrote to Dr David Skene (26 March 1765):

> 'I have already sufficient for six plates as large as my frontispiece, and the Royal Society have oblig'd me with the use of those plates that belong to the Papers I have at different times laid before them.' (Quoted in Groner, 1987.)

Groner has identified these papers as *Phil. Trans.* **49**: 449, **50**: 188, **50**: 845, and **53**: 419. They are not necessarily cited in the present reference list.

Groner (1987: chapter 5) considered that Ellis's correspondence with Skene about this time provides the earliest indication that Ellis was working on a second zoophyte book, though he cited evidence from as early as 1765 that Ellis planned a book on algae which was evidently soon abandoned. We too have come across no evidence that Ellis worked on his second book before 1765 but this possibility is not precluded.

Ellis wrote again to Skene (30 January 1766):

> 'As to my part I shall . . . in my next book . . .' [Edinburgh University Library MS.]

And to the same (28 July 1768):

> 'I have done little or nothing in the Zoophytes having been otherwise engaged. Indeed the getting the plates executed is so troublesome that I am quite disheartened. I had a few which you sent me and am in hopes to tempt a good engraver to live near me for I grow too old to walk 3 mile a day after them.' [Ibid.]

This gives the clear impression that Ellis was sole author. A later letter to Skene also implies this:

> 'What little description [there is] will be in English for I shall only be laugh'd at [if I attempt Latin descriptions]. If I can give my friends an idea equal to what I have myself of them I shall be satisfied.' [Ibid.]

This might suggest that someone else did the Latinized species definitions in the book, but many were copied from the 1755 book. Solander could well have supervised them – but we have no evidence for or against this.

Solander left on the *Endeavour* a month later (26 August 1768; Rauschenberg, 1968), and would probably have been too busy to be of effective assistance to Ellis at this period. Later, Ellis wrote to Skene (26 December 1770):

> 'I have so much business to direct my attention that I have not minded my 2nd volume.' [Ibid.]

This, too, implies that Ellis was intending to be sole author at the time the *Endeavour* left.

Descriptions of the true corals (*Madrepora*)

Most of the extant archival material concerns the *Madrepora* section, which is that most likely to have been written by Solander. Solander returned with Banks from their long voyage with James Cook on HMS *Endeavour* (1768–1771) to a hero's welcome which in a sense went on for several months (Rauschenberg, 1968); but the corals and other cnidarians collected by the expedition were not written up as a collection. The *Madrepora* descriptions (excepting the first three) which appeared in the book probably included some of the *Endeavour* material. Most are quite perfunctory and much less detailed than the species descriptions throughout the rest of the book. Furthermore, Ellis was in poor health from 1773 – soon after the return of the *Endeavour* – and is thought to have had impaired sight from 1774 (Savage, 1934), additional reasons for suspecting that he might not have written the bulk of the *Madrepora* descriptions. Ellis's health perhaps declined gradually until his death in 1776. But Solander is known still to have been healthy, since his death at the age of 49 came as a surprise (Banks, in Rauschenberg, 1964). He was more than 20 years younger than Ellis, and was apparently at that time the more capable of doing the work.

It seems plausible, if Ellis was incapacitated and contributed little to the book after the *Endeavour* returned, that the text was largely written by that time and that he delayed its publication to accommodate the exciting *Endeavour* coral material.

Although many of the coral descriptions were based on earlier accounts, chiefly those of Pallas (1766) and Linnaeus (1767), half (41 out of 81) were described as new to science. One of the 'new' species (the first, described in detail, probably by Ellis) was from the Mediterranean, six were from the 'East Indies', three were from the 'Pacific', two were from the 'West Indies', and in 29 no locality was recorded in the book. In only three of the 'new' species were the collectors named. Such imprecision as to localities and collectors would have been unusual for Ellis, even perhaps in ill health. Hence it seems likely that these are Solander's descriptions, many perhaps being based on his own collections from the *Endeavour* voyage. They are written in a sloppy style quite unlike anything Ellis ever published under his own name alone. Nevertheless, the descriptions can be included among the short list of zoological material from the *Endeavour* voyages said to have received contemporary attention (Rauschenberg, 1968; Whitehead, 1969).

Ellis, it seems, wrote only the introduction to the *Madrepora* section (although this could have been redrafted by Solander: there is no evidence either way) and the descriptions of the first three species; and Solander the rest of that section.

Some further evidence is provided by the pencil illustration of '*Madrepora interstincta*' [*Millepora coerulea* Pallas, 1766 (*Heliopora*)] for plate 56, preserved in the Royal College of Surgeons of England (p. 53). It was engraved by the distinguished Georg Ehret (1708–1770) in 1752, some 24 years before Ellis's death: yet no description of the species is given in the text of the book (p. 167), merely a short synonymy. Such perfunctory treatment differs from Ellis's usually detailed approach and lends weight to the idea that the account of this and hence of most other *Madrepora* species were not his work. It seems inconceivable that Ellis would not have written any notes to accompany such a beautiful and presumably costly illustration. And indeed, it is now known that Ellis had prepared notes on some *Madrepora* species and that Solander did not make use of them (p. 43).

Kerr (1910) implied that Ellis wrote all the coral descriptions, but his was only a passing reference in a sub-heading to a list of specimens in Glasgow University. He headed the table 'List of specimens of corals described by Ellis, and now in the University collection'. Almost certainly the heading represents an unfortunate choice of words rather than an intended opinion on authorship. It happens that none of the three *Madrepora* species described by Ellis was listed by Kerr.

The Ellis manuscripts preserved in the Linnean Society of London include (MS book No. 287, items 109–124; ?Savage, 1948: 92) what the original curator referred to as Ellis's 'home made note book'. It includes drafts of descriptions of several *Madrepora* species. Many of the species were eventually treated in the book (*M. cyathus, M. fungites, M. undata, M. agaricites, M. cristata, M. rotulosa, M. radiata, M. astroites, M. labyrinthiformis, M. meandrites, M. sinuosa*); but some were not (*M. talpa, M. exarata, M. molaris, M. acropora, M. cavernosa, M. indivisa*). Curiously, none of the descriptions nor much of the information in the note book was published. For example, the note book account of *Madrepora undata*, a species newly described in Ellis & Solander (1786: 157, pl. 40), comprises a Latin definition and nearly 100 words of English prose stating *inter alia* that the specimen came from 40 fms (73·15 m) off the north coast of Jamaica, and that it was 8 inches (20·3 cm) long and 7·5 inches (19·1 cm) broad. Under several other species, too, Ellis's notes include details lacking in the book, so it seems most unlikely that Ellis was responsible for their published accounts.

As shown by other evidence also, it seems that although Ellis prepared these drafts Solander wrote most of the *Madrepora* section and did not use Ellis's notes. Unfortunately space does not allow their publication herein, but there is little doubt that in several of the species some information supplementary to that in the book awaits evaluation by scleractinian taxonomists.

Several letters from Solander to Ellis refer to the work on the *Madrepora* section:

> Solander to Ellis. London. 22 July 1774.
> '. . . However, I have waited on Dr Fothergill, to let him know that I would, according to your desire, deliver back to him all the corals that are already figured; but he chose rather that they should remain in your chamber till his return . . .' (Smith, 1821: 14–18)
>
> Solander to Ellis. London. 7 November 1774.
> '. . . This week I shall certainly settle and mark your corals; it vexes me very much that I have not been able to do it long ago . . .' (Smith, 1821: 20)

Evidently Ellis had Fothergill's corals in Solander's rooms at the British Museum and Solander was working on them for Ellis.

Two other letters from Solander to Ellis also give a tantalisingly brief insight into how the two friends worked together:

> Solander to Ellis. London. 9 November 1774.
> 'My Dear Sir,
> 'Yesterday I began to look over and write names to Dr Fothergill's coralls; I went through two of the boxes which stood in the passage, and has selected those who were not figured or engraved. Those that are engraved is placed in the same boxes, and they are now ready to send home [presumably to Fothergill, and hence into oblivion, p. 57]; the others I have laid upon one of your Tables 'till I can find a box to lay them in. Either next Saturday or some day next week I will proceed with the rest. I have also looked over all your plates, and wrote on the paper which they are wrapped up in, the proper names of the subjects which are engraved upon them.
> I am with great regard,
> My Dear Sir,
> Your sincere friend,
> and humble servant,
> Dan Solander.'
> [Linn. Soc. London MS] (Listed by Savage, 1948: 50, under 'undated letters, Daniel Solander, eight letters of no great importance . . .'!).

The first sentence confirms that at least some of the coral material, perhaps Ellis's, was already illustrated, and that some was Fothergill's – perhaps a later batch, originating from the *Endeavour*. Fothergill's name appears only once in the *Madrepora* section, on page 149, but no other collectors are mentioned and it would seem likely that he supplied many of the illustrated specimens. Indeed, it is implied by this letter; and Ellis, in the manuscript description of *M. rotulosa* mentioned already, stated that he had seen a specimen of that species in Fothergill's cabinet. It would seem that Ellis worked on Fothergill's corals himself, presumably some time before Solander worked on them, and maybe on Fothergill corals from sources other than the *Endeavour*.

Evidently Ellis had more than one table at the British Museum in Solander's area. Solander stated his intention to do all Fothergill's coral specimens that were piled up in his passageway; and that he had identified all Ellis's copper engravings – presumably some or all of the coral ones done up till then – and written the names on. This suggests that Ellis was not sufficiently familiar with scleractinians to name for himself all the copper plates he had had made, though it appears that he had at least some knowledge of the scleractinian (madreporan) corals: or perhaps his health prevented him from doing the work. The reference to 'all your plates' perhaps relates only to those of some of the scleractinians (p. 42) and might or might not have embraced the six published herein.

The introductory section of the book (Ellis & Solander, 1786: vi) states that the wealthy John Fothergill paid for some of the engravings, and it may be that these were of his own specimens (which had quite possibly come from the *Endeavour*, p. 57). Thus it seems likely that Solander collected the corals on Cook's voyage and gave or sold them to Fothergill who paid for their engraving (and initial illustration?) for inclusion in Ellis's book – with Solander providing their scientific diagnosis. The impression is overwhelming that Solander was almost entirely responsible for the description of these later 'Fothergill corals' though Ellis might earlier have prepared descriptions of pre-*Endeavour* Fothergill corals which were not eventually used in the book. The advertisement of the book clearly stated that the plates 'were all engraved under Ellis's immediate inspection'; so there seems to have been collaboration over the *Madrepora* species.

Several of these facts indicate that Solander wrote the bulk of the published version of the *Madrepora* section. A further letter adds a little more to the picture:

> Solander to Ellis, London. 22 November 1774.
> 'My Dear Sir,
> If this morning had not turned out to be so very bad, I had proposed to have finished the naming of Dr Fothergill's coralls and begin with yours. Now it must be postponed till next Monday or Tuesday. Last week I went through the aggregated and branched ones. Yesterday I saw Dr Fothergill, when I told him we wanted boxes to lay them in for to send them home, in a safe manner; when he promised to send two or three empty chests to your chambers for that purpose.
> My best complts to Mr Scott and all about you.
> I am with utmost regard
> My Dear Sir
> Your sincere friend
> and humble servant
> Dan. Solander'
> P.S. Mr Banks & Omai are still in the country.
> [Linn. Soc. London, MS] (Savage, 1948).

Solander evidently worked fast, and it was clearly in and around November 1774 that he wrote the descriptions of Fothergill's corals eventually published. He did not make use of Ellis's notes; and it might be deduced that those notes on some of the coral *species*, preserved in the Linnean Society, London (p. 41), relate to non-*Endeavour* material. Solander's modest 'Last week I went through the aggregated and branched ones' indicates that he rushed through most of this section for Ellis in about a week, yet subsequently he became credited by some with having written the whole book (pp. 37–39).

Some of the available evidence suggests that Ellis was for much of the time handling the production of the plates with little or no assistance from Solander. Thus he wrote to David Skene (24 February 1767), a year and a half before Solander left on the *Endeavour*:

> '. . . I shall send you specimens of my plates as soon as I can get them struck off . . .' [Edinburgh University Library MS]

See also Ellis's letter of 28 July 1768 (p. 41), in which use of the first person implies the same; and that of 26 December 1770, when Solander was away, also indicating that Ellis was supervising the plates (p. 56).

The original drawing for Ellis & Solander's (1786) plate 12, figures 2 and 4, also indicates that Ellis was mainly responsible for the plates. The single illustration comprises a specimen of '*Gorgonia ceratophyta*' supposedly growing on one of '*Millepora caerulea*' (=*Heliopora*). The original drawing for the engraving is preserved (Royal College of Surgeons, London, Hunterian Drawings vol. 1, f. 16) and shows that the drawing of *Gorgonia* has been stuck over that of the coral. The engraving shows an identical figure, except that it is reversed. This famous collection of drawings has always been referred to as being of Ellis, and was sold with Ellis's effects (rather than with Solander's) (Hutchins, 1791). The circumstantial evidence from this and the rest of the original drawings is strong that Ellis was responsible for them. Nowhere in the Hunterian volume do contemporary MS annotations indicate an involvement by Solander.

Solander's slip catalogue

Another possible source of evidence on authorship might have been the extensive slip catalogue of plants and animals prepared by Solander and still preserved in the Botany and Zoology Libraries of the British Museum (Natural History) (the 'Solander Slips' mentioned and discussed by among others Sawyer, 1971; Marshall, 1977; Diment & Wheeler, 1984; and Wheeler, 1984*a*, 1984*b*, 1986, all of whom commented on its preparation and contents). However, there are only a few 'zoophyte' slips. Three are of corals (*Madrepora cornucopia, M. hirtella* and *M. turbinata* (=*M. prolifera*)), but only one of these appears in the book (*M. hirtella*, p. 155, pl. 37). Two slips relate to *Alcyonium* species; one to *Spongia* (Porifera); 6 to *Flustra*/*Eschara* (Bryozoa); 37 to '*Corallina*', including hydroids and bryozoans as well as coralline algae; and 7 to *Pennatula* species. But that is all. The joint book includes many more species in each of these genera and it is evident that Solander did not enlarge the slip catalogue from the manuscript of the book which he is known to have had in his possession (p. 47). It could be argued that Ellis might have borrowed any extra slips there were, but this seems unlikely since Solander would have had the opportunity to retrieve them after Ellis died. There is thus no evidence from the slip catalogue that Solander wrote the book. It is noteworthy that there are no slips preserved relating to the extensive Scleractinia material which Solander collected with Banks on Cook's first voyage and which probably formed the basis of much of the published *Madrepora* section.

General correspondence

A letter written by Ellis to Dr David Skene, dated 26 December 1770, included the following:

> 'The tediousness and impertinence of engravers have been the great occasion of delay in publishing my 2d volume . . . We live in hopes of hearing from Banks and Solander tho' our fears encrease as the time is nearly expir'd when they were expected.' (Savage, 1948: 77)

Banks and Solander were on the *Endeavour* with Cook and it seems from Ellis's letter that he was at that time being held up by the engravers, implying that the text was well advanced;

and his use of the first person suggests that at least in 1770 he was intending to be sole author. Possibly when Solander returned with his coral collection Ellis considered joint authorship, but there is no evidence for this.

Two letters from Ellis to Skene indicate Solander's role in assisting Ellis in choosing the generic divisions for the book, and also that Ellis was the senior author:

> '. . . I am beginning to arrange the sea-zoophytes, beginning with the most simple, neither following Linnaeus nor Pallas but my own plan. [A list almost identical with that adopted follows.] I should be glad of your opinion. Since Solander left this [list, before going on the voyage,] I have no friend that knows anything of this dark part of Natural History . . .' (24 September 1768) [MS in Edinburgh University Library]
>
> '. . . I have attempted to place those of which I have or shall give figures in the following order. [There follow 16 generic names as finally adopted in the book.] I have left out the *Cellopora* of Linnaeus . . . I have adopted some of Pallas' genera because I think him right, but I shall bring back the true red coral or *Isis nobilis* to the Gorgonias and call it *Gorgon: estimabilis* . . .' (12 November 1768) [Ibid.]

The two letters suggest that Solander had drafted out the generic divisions for Ellis before leaving on the *Endeavour* in August 1768; but that once he had gone Ellis himself took decisions on which genera to admit. Solander would clearly have had opportunity to alter the order in which the genera appeared after Ellis's death eight years later, but there is no indication that he did so; and he evidently did not change the generic divisions themselves. His role in this can hardly be considered authorship.

Ellis's correspondence with Linnaeus might also be expected to provide a clue. The correspondence is largely available, preserved in the Linnean Society of London. Most of it was published by Smith (1821), with his own apparently random emendations, and a few additional items by Savage (1948). Here again there is good evidence which points to Ellis having written the descriptions. In a letter to Linnaeus dated 25 September 1770 Ellis stated (six years before his death):

> 'I have not time from public business to attend . . . my System of Zoophytes as I could wish but live in hopes to print it in time. At least *I will leave my figures and descriptions to the world* and wish they were done by abler hands . . .' (from the original; italics ours; Smith's published transcription has emendations).

From this it would seem likely that Ellis did leave many of the species descriptions but the extent to which they were emended by Solander, or for that matter by Martha Watt, is hard to determine. The *Endeavour* had not yet returned and Ellis's comments do not contradict the idea that the book was largely ready; and that on the return of the *Endeavour* publication was delayed to accommodate the new, largely scleractinian, zoophyte material from it.

Some of Ellis's letters to Linnaeus (Smith, 1821), as hinted by Rauschenberg (1968), indicate that Solander might have helped prepare some of the descriptions made towards the end of Ellis's life, particularly those of the *Madrepora* species. But there is no firm evidence of his having a role after Ellis's death in 1776.

However, there is a suggestion that Solander might have continued to work on corals after Ellis died. Sir William Hamilton (1730–1803), who 'resided at Court' in Naples, wrote 9 February 1779 from near there to Banks:

> 'I have sent Solander a collection of corals for our Museum. There are duplicates of many, which he may give to you if they should be curious and worth your acceptance.' (Smith, 1911: 62).

However, only two localities given in the *Madrepora* section of the book are Mediterranean (species 1, '*Madrepora patella*', probably described by Ellis and hence too early to have been part of Hamilton's shipment; and species 15, '*Madrepora oculata*', one of Solander's descriptions). Hamilton's name does not appear in the section and almost none of the species descriptions is accompanied by a locality. Thus although the amount of use made of Hamilton's collection by Solander when preparing the *Madrepora* descriptions cannot be deduced accurately, it seems to have been little or none.

Martha Watt evidently had some difficulty in recovering the manuscript of the book when Solander died in 1782 since she wrote to Sir Joseph Banks on 1 September 1782 thanking him for:

> 'the trouble you have taken in recovering my Father's papers. Not having received any account previously to that you had kindly indulged me with last week, I began to apprehend the Manuscript was mislaid amid such variety of papers relating to Natural History as our late worthy friend [Solander] must have had in his possession.' [British Library Manuscripts Dept., *Add. MSS* 33977, f. 173].

The letter confirms that when Solander died he had the (?entire) manuscript in his possession. He might have been writing parts of it, but there is no evidence for this and he might merely have been working in an editorial capacity, or even doing no work on it at all. Bearing in mind that Solander was a close friend of Banks, it would have been discourteous of Martha Watt to have implied in her letter that the MS of the book was Ellis's alone unless this were true. Possibly she did not know of Solander's role in the *Madrepora* section.

Expertise and seniority

Ellis undoubtedly enjoyed the assistance of Solander in later years both in his zoophyte research and in Solander's having supervised the preparation of at least some of the engravings of Ellis's specimens (above evidence; also Rauschenberg, 1968). Although Solander did not have a great published output, he nevertheless spread himself widely in research over both animal and plant kingdoms and is validly regarded as having been one of the earliest professional biologists in Britain (Rauschenberg, 1968; Marshall, 1977; Stearn, 1981; Wheeler, 1984*b*). A student of Linnaeus, he eventually became the sole natural history curator in the British Museum. Ellis, on the other hand, was an amateur naturalist, being by profession a merchant and both a King's Agent and a Colonial Agent (exhaustive account in Groner, 1987; other references above). But Ellis had a deep interest and great expertise in hydroids and other zoophytes, and in a number of other rather specific aspects of natural history. In contrast to Solander's youthful impact on the European cultural scene Ellis was probably about 45 when his first book appeared (Ellis, 1755), and he did not communicate with Linnaeus until the following year (Carruthers, 1901). It would seem natural, therefore, for Ellis to concentrate in the joint book with Solander on the description of those zoophyte groups on which he had already published – in fact almost all of them – and for Solander to help whenever he could. Since Solander was about twenty-three years Ellis's junior it might have been natural for this reason also for Ellis to have had the greater share of the writing.

Ellis, too, was unusually talented, rising from obscurity in which even the year and place of his birth were uncertain (p. 18; discussion in Groner, 1987) to become a successful merchant, a King's Agent, a Colonial Agent, a Fellow of the Royal Society, and a leading light in one of the great international biological debates of the eighteenth century, that concerning the animal nature of zoophytes. He stood significantly above most contemporary European writers on zoophytes. By 1755 he had developed a rare style of writing in which there was a strong tendency for the observed facts alone to find place so that even today his works seem remarkably free of errors.

In striking contrast, bibliographic sources show that Solander never otherwise published on zoophytes and during his whole life published hardly a single item on any zoological subject as senior author (Rauschenberg, 1968). He was, however, junior author of several botanical works and sole author of some lengthy manuscript catalogues – mostly now preserved in the British Museum (Natural History) (Diment & Wheeler, 1984). The greatest zoological publication with which he was associated as nominal author was the book with Ellis. Perhaps if he had lived beyond the age of 49 some of the promised works might have followed, and it should be borne in mind that there was little pressure to publish quickly in those days. Nevertheless, it must be said that many other naturalist authors of the time were relatively prolific, and almost all were amateurs in that they were not paid for their work. Solander, the professional, seemingly had ample opportunity to publish but he hardly ever did. The conclusion that he was the sort of person who is slow to publish is inescapable. This does not necessarily detract from his scientific ability. Such people are of course common today, and it seems unnecessary to invoke special eighteenth-century conditions to explain the lack. It has been suggested that the 'slip catalogue' preserved in the BMNH was to have been along the lines of the *Systema naturae* (p. 23). In Rauschenberg's (1968: 57) opinion Solander's death came at the height of his career. Yet the near absence of published zoological works is striking, considering the opportunities he must have had.

In the 1770s there were hardly any publications on hydroids and other zoophytes available (Bedot, 1901) and certainly few comparable in merit with Ellis's (1755, 1767) first book. Hence it seems still less likely that Solander might have written the bulk of the joint work.

The manuscript captions in the British Library copy

Jonas Dryander (1748–1810) was once Solander's shared assistant and was sucessor to his post. Dryander (1796) noted that the six extra plates were found after the death of 'the author' (p. 25), implicitly Ellis, though whether this was before or after Solander's death is not clear. The manuscript captions on the fly-leaf are in Dryander's hand (J. B. Marshall, pers. comm.; Marshall, 1978). If Solander had seen these six plates, and had Solander written the text of the book, one would have expected a printed cross-reference to them by Solander on the appropriate pages. But the only cross-references are those written in the margins, probably also by Dryander, suggesting that Solander did not prepare the text or modify it later and, therefore, that the text had already been written before Ellis's death.

Evidence from the published text

Some of the evidence on authorship presented so far is open to alternative interpretation. Among the strongest evidence, however, is that which can be gleaned from the published work itself. Throughout the text there are occasional sentences in the first person singular, and the contexts in which they occur suggest overwhelmingly that Ellis was the author. It remains possible, but seems most unlikely, that Solander wrote these passages as though written by Ellis. Although the quotation from Banks already mentioned (in Rauschenberg, 1964) indicates that Solander did this kind of 'ghost writing' a much simpler explanation is that Ellis was the true author. A typical example (Ellis & Solander, 1786: 33) runs: 'In my Essay on Corallines [Ellis, 1755: 32] I have taken notice that . . .'. Further, *nowhere in the joint work does use of the first person singular imply authorship by Solander.*

Apparently unequivocal indications that Ellis wrote at least the draft of the text occur in most of the 16 included genera (though *Madrepora* must be excepted: p. 42). In the list which follows the page numbers refer to indications of this sort. The extent of the account of each genus is indicated by the page numbers following its name.

I *Actinia* (Pp. 1–8) Pp. 1 (re *Actinia sociata*; see also p. 5); 7.

II *Hydra* (Pp. 8–10) No direct evidence, but use of the first person singular suggests that Ellis wrote this section.

III *Flustra* (Pp. 10–18) Pp. 12, 15, 16, 17.

IV *Cellaria* (Pp. 18–30) No direct evidence, but since so many as 13 of the 18 species included were described earlier by Ellis alone it seems probable that he would have written at least most of this section. The remaining five species were described as new in the joint work.

V *Tubularia* (Pp. 30–32) No direct evidence, but the three included species had each been first described by Ellis so that it seems probable that he would have written this section.

VI *Sertularia* (Pp. 32–60) Pp. 33, 34, 35, 41, 43, 45, 45–46, 46, 50, 54. No fewer than 27 of the 36 included species had been described earlier by Ellis (1755) so it seems highly likely that he would have written this section. Indeed, it is in this genus – now largely disbanded amongst other hydroid genera and some ectoproct ones – that Ellis made his greatest contribution to 'zoophyte' studies.

VII *Pennatula* (Pp. 60–67) Pp. 62, 62–63, 63, 64, 65. Of the ten included species nine had been described by Ellis in earlier works, six as new to science. Almost certainly he would have written this section.

VIII *Gorgonia* (Pp. 67–97) Pp. 68 (twice), 70, 75 (twice), 76, 84 ('The specimen was presented to me by Dr Solander'), 86 (The specimen was 'sent to me . . . in the year 1755' – before Ellis had started to correspond with Linnaeus, and even longer before he had met Solander), 89.

IX *Antipathes* (Pp. 97–104) Although the first person singular is used in places in this section there seems no unequivocal clue as to authorship.

X *Isis* (Pp. 104–108) Again, no decisive evidence. The clause 'We likewise find that' (pp. 106–107) could be a turn of phrase and not a valid use of the first person plural. Ellis (1755) frequently wrote in this way in his earlier book, unquestionably a single-author work.

XI *Corallina* (Pp. 108–128) Pp. 109, 119, 122, 127.

XII *Millepora* (Pp. 128–143) Pp. 128, 133 ('We frequently observe . . .' – see note under *Isis*), 139, 140 ('I had . . . a specimen . . . from Dr Solander'), 141.

XIII *Tubipora* (Pp. 143–145) P. 144 ('Dr Solander saw [*Tubipora musica*] in vast abundance . . .').

XIV *Madrepora* (Pp. 145–173) Pp. 146 ('By Madrepore corals, we mean . . .', conceivably indicating joint authorship – see note under *Isis*, above), 149. Authorship of this section was probably largely by Solander, and is discussed above (pp. 42–45).

XV *Alcyonium* (Pp. 173–182) Pp. 176 (twice), 177 ('We have but an imperfect figure of it in Rondeletius; but . . . Dr Schlosser has given us a very good figure of it in . . .', again almost certainly a turn of phrase rather than an indication of joint authorship: see note under *Isis*), 178, 188.

XVI *Spongia* (Pp. 182–191) P. 182 (three times); also p. 182 ('. . . my letter addressed to Dr Solander . . . Phil. Trans. vol. 55, p. 280').

The published captions

Many of the captions to the plates are extremely brief but others are more extensive. It is perhaps justifiable to ascribe them respectively to Solander and Ellis; but many are intermediate and could have been written by either of them, so that a detailed analysis would be necessary. Only in two is there a firm indication that Ellis was not the author: Pl. 26 'No explanation of this plate was found in Mr Ellis's papers'; Pl. 32 'No explanation of this plate was found.' One might have expected Solander to have identified the species depicted on these particular plates had he worked on Ellis's manuscript following Ellis's death. It is possible that the book's eventual editor, Martha Watt, was responsible for these and for some of the other captions. It would seem inescapable for her not to have been involved with them at least to some extent, since ensuring that they matched the plates and the names used in the text would have been a necessary editorial task. There is no firm evidence for or against Solander's having been involved in writing the captions, but it would seem likely that he was at least partly involved since he had identified the coral plates. Similarly, neither is Ellis precluded.

Authorship: concluding remarks

The date when Ellis started working on the 1786 book is unclear. The earliest indication is 1765 but the absence of information before that date does not preclude an earlier start.

The book is unusual in lacking an introduction, excepting that provided by Martha Watt which really comprises a preface to the main text. This is in striking contrast to Ellis's (1755) earlier work in which the introduction spans 13 pages. We have come across no manuscript material which might have formed an introduction, but this does not preclude Ellis's having written one which was subsequently lost. Solander clearly had ample opportunity to prepare an introduction. But though he might have done so and it might have been lost, the lack of evidence of his having done detailed editing of the book makes it seem more likely that he did not prepare one.

There seems good evidence that Ellis wrote almost all the text of the book in its final form, and this is in keeping with his having published widely on the 'zoophyte' groups. Nowhere in the text is there a reference to any event between Ellis's death in 1776 and Solander's in 1782, nor indeed to any between 1776 and the book's publication early in 1786: circumstantial but strong evidence that the text was written before Ellis's death. Solander, the younger man by some 23 years, although undoubtedly helpful to Ellis, seems to have written only the bulk of the *Madrepora* section, just 21 of the book's 206 pages of text. However, Solander's contribution should be seen in perspective. It includes a disproportionate number of species per page; and Solander's assistance with the plates (p. 39) also justifies his nominal joint authorship. Evidence on authorship of the captions is inconclusive.

Ellis's drafts of the *Madrepora* species descriptions preserved in the Linnean Society of London were not used by Solander. The first three species in the *Madrepora* section were probably written by Ellis. The remainder of the account of this genus was probably written by Solander in November 1774 (p. 43), towards the end of Ellis's life. Ellis's health and eyesight were failing in 1774 (Savage, 1934) and it would perhaps have been natural for Solander to take on the remaining work. As Whitehead (1969) remarked, it was probably based partly on Banks's and Solander's *Endeavour* material, but also on Fothergill's (some of which originated from the *Endeavour*), on a few specimens in the collections of the Duchess of Portland, and on material from several other collections (p. 54).

It might be expected that after Ellis's death Solander would have played some editorial role, and as much is implied by the title page and by Martha Watt's introduction. However, there seems no evidence that Solander materially altered Ellis's descriptions other than in the genus *Madrepora* as outlined – and then only by not using Ellis's drafts. Why he did not use them is unexplained. Both authors were alive at the time and the extant correspondence shows that they were in friendly contact, yet Solander's descriptions left out such important data as collecting localities that were included in Ellis's drafts (p. 43). With the rest of the book, it may be that Solander simply collated the manuscript material left by Ellis with the illustrations – but there is no evidence that this task was not done by Martha Watt who, being Ellis's daughter, might well have known enough of the subject to have done it. Indeed, her letter to Banks in 1782 (p. 47) suggests that in fact Solander had *not* been working on the manuscript.

Production of the book

Solander died some six years after Ellis. Sir Joseph Banks retrieved the manuscript from amongst Solander's effects soon after Solander's death and passed it to Martha Watt. A letter from Martha Watt written in September 1782 shows that Banks had located the manuscript and offered to help in the editing of the book, and also that she accepted his offer (BM Add. MSS. 33977 f. 173; précis in Dawson, 1958: 861). However, we have no evidence on the extent to which she actually drew on his help. Her energy, it seems, was largely responsible for the eventual publication of this remarkable book. There is no evidence that either she or Banks changed the text, but either might have done some work on the captions. The introduction, written by her, implies by default that Banks was not deeply involved in the book's production – though it was dedicated to him. Banks's implied lack of involvement is surprising since he was clearly able to help and had known both authors, and perhaps also Martha Watt, for a long time. All the evidence suggests that the manuscript they left was in an advanced state so perhaps Banks had confidence in Martha Watt to see it through publication. There is evidence that around 1 September 1782 Martha Watt sought Banks's advice on the process of publication (Watt to Banks, BL *Add. MSS*. 33977 f. 173). Slightly prior to this all Solander's manuscripts had been impounded by the Swedish embassy in London. An undated letter from Martha Watt apparently to the then publisher of the book indicates that she was relying heavily on Banks to retrieve the Ellis & Solander manuscript from the embassy (BL *Add. MSS*. 33982 f. 243). Whether or not the copper engravings were included is not indicated in the letter, and we have not determined if the six missing ones (present figs 2–7) might still be extant in Sweden. Certainly the effusiveness of Martha Watt's introduction to the book would suggest that had Banks been more greatly involved, she would have acknowledged him appropriately.

The sequence of known events concerning certain aspects of the production and publication of the book as deduced herein is as follows:

> September 1770, Ellis wrote to Linnaeus implying that he had completed the 'figures and descriptions';
>
> 12 July 1771, *Endeavour* returned (Rauschenberg, 1968); Ellis perhaps delayed the book to incorporate new material, especially scleractinian corals;
>
> 1773, Ellis in poor health;
>
> November 1774, Solander prepared most of the *Madrepora* section and shortly after returned many (?*Endeavour*) coral specimens to Fothergill;
>
> October 1776, Ellis died, the book still unpublished;
>
> May 1782, Solander died;
>
> August 1782, Banks retrieved the manuscript from Solander's effects, apparently impounded by the Swedish embassy, and passed it to Martha Watt;
>
> 23 February 1786, copy presented to Royal Society.

Notes on some of the original drawings for Ellis & Solander's *Zoophytes*

The history and provenance of these drawings was outlined by Sir Sidney Harmer (1931*b*) who commented on them in some detail. One, of the coralline alga '*Corallina lichenoides*', has recently been reproduced by Woelkerling & Irvine (1986: fig. 2), and another is reproduced here (Fig. 9). The drawings were purchased by John Hunter (1728–1793) at the Ellis Sale in 1791. Some of these aspects are discussed further elsewhere (pp. 54–61). Today the drawings are preserved in the Library of the Royal College of Surgeons, London, in a folio volume entitled 'Hunterian Drawings, Vol. I'. As noted by Harmer, the volume includes all the original drawings for most of the plates of stony corals and for many of the illustrations of other groups in the Ellis & Solander (1786) book; and a number of Ellis's pencil sketches and some of the drawings for three of the six previously unpublished plates (64, 65, 67). It includes also many of the drawings for the plates in the earlier book (Ellis, 1755), and some from his papers in *Philosophical Transactions*. Some helpful typewritten notes by Harmer are bound in. In addition a few rough sketches by Ellis are preserved in the manuscript collection of the Linnean Society of London (Item 287).

There follows an annotated list of the drawings relevant mainly to the scleractinian corals in the 1786 book from notes made by JWW in 1934, by both of us in 1978, and by PFSC in 1986. Asterisks (*) indicate specimens now in the Hunterian Museum, Glasgow, following a manuscript list compiled in 1978 by Dr P. E. P. Norton (see also Table 2). The lists published by Young (1877) and Kerr (1910) were less complete. The artist is listed where indicated on the drawings or otherwise known to us. Most of the plates were reversed from the drawings when published. A note under pl. 12 indicates that at least some of the drawings were arranged for the plates by Ellis himself (rather than by Solander).

Plate/Fig.

12	Fig. 1	*Gorgonia mirabilis* (Folio 16)
	Fig. 2	*Gorgonia ceratophyta* on Fig. 4 '*Madrepora caerulea* (=*Heliopora*). Two drawings, that of *Gorgonia* stuck over and overlapping that of *Pocillopora*. (Folio 16)
	Fig. 3	Wanting.
	Fig. 4	*Millepora (Pocillopora) caerulea* (See under Fig. 2.)
	Fig. 5	*Isis coccinea* (Folio 16)
13	Fig. *5	*Madrepora axillaris*. Pencil (Folio 17).
28		Miss Ellis. Reversed (on the printed plate). *Madrepora patella, M. fungites, M. cyathus.*
*29		Simon Taylor. Not reversed. *M. anthophyllites.*
30		J(ames) R(oberts) fecit 1769. *M. fascicularis.*
*31		G. D. Ehret pinx$_t$ 1753. Coloured. Figs 5–6, *M. flexuosa*. Figs 3–4, not those of the engraving: they show a non-carinate species of *Pavona*. Not reversed.
32	Fig. 1	Drawing shows dentate septa more clearly. Reversed. *M. tibicina*? Appears to be *Hoplangia durotrix*. Only part of drawing finally engraved. See also p. 60.
	Fig. 2	Only part was engraved.
33		J. R. 1769. *M. fastigiata*. Folio 55 has an ink-and-wash drawing by J. Roberts, dated 1769. It is not the engraved version, which lacks a patch of *Porites* just below the middle corallite.
*34		J. R. delin., 1769. *M. angulosa*. Much of the background not engraved.
*35		*M. carduus*. Reversed.
36		*M. virginea*. Not reversed. Part of the substrate not engraved.
37, 38		No drawings.
*39		G. Miller sculp. Ink and wash. Not reversed. *M. aspera*.
*40		G. D. Ehret del. 1755. Coloured. Not reversed. Drawing shows about half as many septa as the engraving. *M. undata*.
*41		Drawn March 1773. *M. ampliata*.
42		*M. cucullata*. Not reversed. J. Barnes on engraved plate.
*43		J. Barnes del. et sculp. Not reversed. *M. cinarescens*. Verso: fine drawing of *M. agaricites*.
44		J. Roberts del. *M. lactuca*. Also a sketch for this in oils. See also present Fig. 10.
*46		J. Roberts del. 1 January 1774. *M. daedalea*. Fig. 3 shows a continuous spongy columella better than the engraving.
47	Figs 1–2	*M. porites*.
	Fig. 3	appears to be *Favites* sp.
	Figs 4–5	*M. areolata*.
	Fig. 7	*M. galaxea*, tinted brown.
48		No drawing.
49		J. Roberts del., 1772. Fig. 1, *M. denticulata*.
	Fig. 2	*M. siderea*.

Fig. 3 *M. exesa.*
The drawings are better than the engravings.

*50 Fig. 1 *M. favosa.* Drawing shows mussid teeth and columella well.
Fig. 2 *M. abdita.*

51 *M. gyrosa.*

52 No drawing.

53 **M. annularis; M. stellulata;* **M. faveolata; M. pleiades.*

54 J. Barnes del. et sculp.
Fig. 1 *M. spongiosa.*
Fig. 2 *M. retepora*, ink-and-wash.

*55 *M. rotulosa.* A very poor oil sketch. Reversed.

56 Ehret, 1752. *M. interstincta [coerulea].* Coloured blue on ink drawing. Reversed.

57 J. Barnes. *M. muricata.*

58–63 No drawings.

64 (See present Figs 2, 9).
Fig. 2 *Cellaria ternata.* Reversed. Pencil. (Folio 53, D).
Fig. 3 *Sertularia spicata.* Reversed. Pencil. (Folio 47, H).
Fig. 4 *S. spicata.* Reversed. Pencil. (Folio 52, I).
Fig. 5 *S. evansi* on *Fucus.* Reversed. Pencil. (Folio 47, B).
Fig. 6 *S. evansi.* Reversed. Pencil. (Folio 49, E).
Fig. 7 *Corallina pinnata.* Reversed. Pencil. (Folio 48, C).
Fig. 8 *C. loricata.* Reversed. Pencil. (Folio 57, A).
A life-size habit drawing of '*Cellaria ternata*' also appears on Folio 53, but although it has brown transfer powder on the verso it does not appear on plate 64.

65 (See present Fig. 3)
On verso of Folio 28. Figs 1, 2 *M. mammillaris.*
Fig. 3 *M. oculata.* Reversed.

66 (See present Fig. 4)
See 'Folio 58', below.

67 (See present Fig. 5)
Fig. 1 *M. agaricites.* On verso of Folio 30.
Fig. 2 *M. sinuosa.* On verso of Folio 32.
In addition there are some drawings by Ellis, probably tentative sketches or lay-outs for plates:

FOLIO:

47 Hydrocoral (*Stylaster* or *Allopora*).

50 Verso. Sketch for details of *Tubipora.*

53 & 54 Verso. Four sheets of pencil sketches of corals. None seems to be for engravings. They are marked in upper corners 'Pl. 55', 'Pl. 56', 'Pl. 57', but are not the originals for those plates.

58 Upper sheet: pencil sketches, evidently a study for a plate. One is *M. rosea*, same as Pl. 66, fig. 4 (present Fig. 4); another is *M. violacea*, same as Folio 47 above, but not *M. violacea* of the text.

Folio 58 also includes several unpublished drawings of species described in Ellis & Solander (1786):

Tubularia ramosa Ellis & Solander, 1786: 32 (today referred to *Eudendrium* [Hydrozoa].
Millepora spongites Ellis & Solander, 1786: 132.
M. cervicornis Ellis & Solander, 1786: 134.
M. skenei Ellis & Solander, 1786: 135.
M. verrucaria Ellis & Solander, 1786: 137.
M. alcicornis Ellis & Solander, 1786: 141.
Madrepora rosea Ellis & Solander, 1786: 155 (today referred to *Stylaster*, p. 31).

59 Rough pencil sketches of *M. astroites, M. radiata, M. cavernosa* and *M. interstincta*. Also a sketch of a coral, pl. 20, fig. 14, of Ellis (1764: *Phil. Trans.*, p. 52) [*Galaxea ellisi* Milne Edwards & Haime, 1857].

The dispersal and fate of Ellis's manuscripts and collections

The Ellis manuscripts that survive are tolerably well documented (Savage, 1948), much of his correspondence is published (Smith, 1821), and the drawings from which the 'zoophyte' illustrations for his two books (Ellis, 1755; Ellis & Solander, 1786) were engraved are well preserved (Harmer, 1931*b*; personal observation by both of us in 1978). Recently Groner (1987, appendix) has listed much archival material either written by Ellis or concerning his life. In contrast, most of his collections and those of others on which he worked were dispersed soon after his death and now can hardly be traced.

Origins of the Ellis & Solander material

The origins of many of the specimens described in the book were indicated in the text. Groner (1987) has provided a summary, from which the following is drawn: John Greg (11 specimens direct to Ellis, a further 6 via the Earl of Hillsborough) [Greg and Hillsborough each gave material to the BM as well; A. C. Wheeler, pers. comm.]; John Fothergill (5 given to Ellis); Banks and Solander (several *Endeavour* specimens); the following, small numbers – Jean-Baptiste Bohadsch, Rev. Dr William Borlase, Gustavius Brander, Mark Catesby, Rev. Clarke, Vitaliano Donati, Joseph Gaertner, Corbyn Morris, P. S. Pallas, Dr James Parsons, Thomas Pennant and William Webber. The sources of many other specimens were not indicated. Both Ellis and Solander had ready access to the collections of Fothergill, the BM, and the Duchess of Portland, and many specimens from these sources were described in the book. Lastly, many of the species included were those that had been described already in Ellis's earlier book (Ellis, 1755) based largely on Ellis's own cabinet – at that time collected largely by himself.

Thus, apart from Ellis's own collections, the material came from many sources. With this exception, there never was a single large repository of Ellis & Solander types; and their subsequent whereabouts would be difficult to trace. However, the fate of a small proportion can at least be commented on; and if only a small amount of type material survives, at least the way can be shown to be largely clear for the future designation of neotypes.

Surviving material

The potential importance of any surviving Ellis or Ellis & Solander material would be great. For example, Ellis's earlier book (Ellis, 1755) was cited as sole taxonomic indication under many of the *Sertularia* species described by Linnaeus (1758) so that some, perhaps many, of the specimens in Ellis's cabinet were probably types of the corresponding Linnean species. Short notes concerning other aspects of the Linnean *Sertularia* species and Ellis's publications and collections have been published elsewhere (Cornelius, 1975*a*: 267, 273; 1975*b*: 394; 1979: 309). Probably similar importance would attach to Ellis (1755) zoophyte specimens referred to other genera by Linnaeus (1758). In addition, numerous species were first described in the second book (Ellis & Solander, 1786) and mentioned specimens from that work are similarly important. A review of a lot of the earlier work attempting to locate the Ellis collections of both animals and plants was provided by Dixon (1960). The notes which follow largely present an account of the continued loss of these important collections.

Most noteworthy of the surviving specimens are the dozen or so Ellis & Solander corals still preserved in Glasgow (Young, 1877; Kerr, 1910; Wheeler, 1986: 29; see also Table 2). There is another of the illustrated coral scleractinian specimens in the BMNH (present Fig. 10). A single hydroid specimen said to have originated from Ellis is preserved in the Royal College of Surgeons (p. 61). A single sponge specimen surviving intact in the BMNH collections has recently been located by Professor P. R. Bergquist and S. M. Stone. It is currently labelled *Phyllospongia foliascens* (Pallas, 1766), regd. no. 1872.9.25.1, presented by R. G. Whitfield; and is illustrated in Ellis & Solander, 1786: pl. 59, fig. 1, without textual comment apart from the caption 'sponges from Otaheite' (Tahiti). This interesting specimen has been studied by Bergquist *et al.* (in press). At least one species, a coralline alga, now has a designated neotype specimen and the original pencil drawing of it has been reproduced (Woelkerling & Irvine, 1986). It is probable that most of the hydroid specimens in the Linnean Herbarium in London were given to Linnaeus by Ellis (Svoboda & Cornelius, in press) but this certainly occurred after the publication of Ellis's first book (Ellis, 1755). Though the specimens might have originated from Ellis most are probably not primary types of the species included in the tenth edition of the *Systema naturae* (Linnaeus, 1758) (Cornelius, 1979: 309, notes 13–14). However, a specimen of the hydroid *Aglaophenia pluma* (Linnaeus, 1758) in the Linnean collection has been designated neotype (Svoboda, 1979; redesignated lectotype by Svoboda & Cornelius, in press); and others of *A. kirchenpaueri* (Heller, 1868) recognized as perhaps comprising the earliest record of the species from the British Isles although the species was not at that time recognized as distinct (Svoboda & Cornelius). Both these *Aglaophenia* specimens were almost certainly collected by Ellis. Certain of the Linnean hydroids are known to have origins other than Ellis but these are only a few (Cornelius, 1979: 309).

Engravings for the plates

Lamouroux (1821), in his preface, recorded that he had obtained the 63 copper plates of Ellis & Solander (1786) for reproduction in his own book. We have not attempted to trace their subsequent fate.

British Museum material (see also section on Ellis's hydroids, below)

It seems that some, maybe all, of the 1421 specimens of 'corals, sponges &c' in the collections of Sir Hans Sloane (1660–1753) (de Beer, 1953) were in the BM when Solander and Ellis worked. Some were undoubtedly used by them when compiling the book, for in just a few places in the text they acknowledged the BM collection. But there is little specific evidence of the subsequent fate either of Sloane's zoophyte collections as a whole or of the particular specimens indicated by Ellis & Solander (1786). Many might have perished in the early years of the nineteenth century (p. 57).

Ellis & Solander (1786) indicated BM material on pages 44–45 (*Sertularia myriophyllum*), 66 (*Pennatula argentea*), 86 (*Gorgonia placomus*), 110 (*Corallina monile*, a green alga, today known as *Halimeda monilis* (E&S)), 141 (*Millepora alcicornis*), 158 (*Madrepora lactuca*), and 179–80 (*Alcyonium mammillosum* and *A. ocellatum*). Of this material, only the specimen of the coral *Madrepora lactuca* has definitely been located in the modern BMNH collections (see caption to Fig. 10). A contemporary herbarium-preserved hydroid specimen of *Sertularia myriophyllum* [regd. no. 1973.10.5.50 (sic)], today referred to the genus *Lytocarpia* (= *Thecocarpus* in part), might be that mentioned by Ellis and Solander. But there is no definite indication and the specimen is smaller than the illustration in the book implies. In addition to the material indicated to be in the BM by Ellis & Solander, material they noted as being then in other collections might have been deposited there after the book was printed: but we have not checked this possibility.

In 1983 our colleague Dr Shohei Shirai, of Mie-Kon, Japan, surveyed all the recent scleractinian types in the BMNH and found no Ellis & Solander type specimens.

Whitehead (1975: 61) noted that in 1809 many natural history specimens were sold by the

BM to the Museum of the Royal College of Surgeons of England, London. The sale included many specimens, and is well known (e.g. also Barber, 1980: 162; Stearn, 1981: 21–22). A. C. Wheeler kindly showed PFSC typed transcripts of the manuscript reports indicated by Whitehead. They included no reference to cnidarian material so it would seem that Ellis & Solander specimens did not reach the Royal College of Surgeons by this route. One memorandum, dated 5 March 1836, by W. Clift (1775–1849), Curator at the Royal College of Surgeons, details all the specimens. It is clear that they were almost entirely vertebrate, mainly medical and anatomical (Clift, 1836).

The statement by Cornelius (1975*a*: 267) that some Ellis hydroid material is present in the Hans Sloane herbarium, preserved in the BMNH, differed from the opinion of Dandy (1958) who considered the material Cornelius cited to have originated from Buddle. Dandy was probably correct.

The 'four glazed frames' of Ellis's 'zoophyte' specimens mentioned by Ellis (1755: vii), exhibited at the Royal Society in June 1752, and once hanging in a room in the old British Museum building, have still not been traced. They were probably decorative montages comprising hydroids, bryozoans, coralline algae and 'keratophytes'. The BM building was 'transformed' between 1823 and 1847, partly to accommodate the fast-growing natural history collections (Stearn, 1981: 41). The four frames have not been reported subsequently, possibly being disposed of at that time. Ellis's own account and description indicates that they were prepared at least as early as 1752. Since many of the species accounts in Ellis's (1755) first book were used as indications by Linnaeus it follows that some of the specimens in the glazed cases would have been eligible for type status. Rymsdyk & Rymsdyk (1791: 53) also mentioned the specimens: 'They have in the British Museum, in the Coral Room, on the chimney four pictures disposed in the form of landscapes of various classes of Coral, with their explanations given by Mr. Ellis, who endeavoured to prove that they are all of the animal kind.' They thus formed part of a scientific exhibit demonstrating one of the much-debated biological questions of the day; but whether they were originally prepared with that in mind cannot be determined. They were mentioned also by Harmer (1931*a*: 83): 'four glazed frames containing specimens presented by Ellis to the Royal Society, were later in the British Museum, but no trace can be found of this collection'; and by Sherborn (1940: 49): 'Antipathes were in a case over a mantel in the British Museum but no trace could be found in 1929.' It is not clear what evidence Sherborn had that antipatharians were involved. Wheeler (1984*a*: 27) recorded the presenting of these framed montages of specimens to the BM shortly before 7 September 1758. He told us of an entry in the *Donation Book* of the BM for 1756–1782: '7 September 1758, 4 pictures of corallines, and nine specimens of corals and keratophytes, from John Ellis, Esq.' which are presumably these items. Further literature citations to these 'pictures' were given by Dixon (1960) who confirmed their continued loss.

A. C. Wheeler kindly brought to our attention what is apparently the only relevant entry in the *Diary and Occurrences Book* of the BM (Add. MSS 45875, f. 5) for 21 October 1774 (shortly before Solander wrote the *Madrepora* descriptions for the Ellis & Solander book – see p. 43): 'John Ellis of Wimpole Street, Esq., has presented several specimens of corall [sic], from Jamaica. D. Solander.'.

Rauschenberg (1978*a*: 162) stated that during Ellis's lifetime his zoophyte collections were 'housed in his own quarters for a time, then in the British Museum, and finally in Ellis's last years at the Royal Society'. However, it is evident that with perhaps a single exception (Fig. 10) the specimens are no longer in either institution and were sold some time after Ellis's death. The specimens concerned might have been the four glazed frames already discussed, or other material from Ellis's collections. Thus Ellis wrote to David Skene (26 December 1770):

> 'I . . . could not send you the specimen of Zoophytes that you desire having long left off collecting, and what few I have I have given to the British Museum and have framed for the Royal Society.' [Edinburgh University Library, MS]

Between Banks's death in 1820 and the 1840s when the energetic curator J. E. Gray became involved with the zoological collections, the British Museum was not a safe place for delicate or unfashionable biological material. One historian has commented:

> 'The inability of the Natural History Department even to conserve its specimens . . . was so notorious [at this time] that the Treasury frequently refused to entrust it with specimens that had been collected at the Government's expense' (Barber, 1980: 162).

Many specimens were burnt, and eventually the 'basement was cleared of its former dross' (Miller, 1973: 115). Among it was possibly much zoophyte material from Sloane, Ellis, Solander, Banks and the *Endeavour*. The Museum's reputation for curation has since changed!

Numerous herbarium-mounted hydroid specimens stored in the botanical collections survived this sorry period, however, including many which had been collected from Ireland by Robert Brown (1777–1858), the first Keeper of Botany. These are now preserved in the Zoology Department of the BMNH. Apart from these there are few hydroids from the eighteenth century zoological collections of the BM extant today.

Fothergill's collections

The extensive collections of John Fothergill (1712–1780) were examined by Ellis & Solander in the 1760s and 1770s (presently cited correspondence, p. 43). A number were described in their book and would be types. Thus in a letter to David Skene Ellis wrote (22 October 1765):

> 'I . . . have the pleasure of often seeing my good friend Dr J. Fothergill who [visits me at home – Ellis was temporarily sick]. He has the best collection perhaps of any one person, of shells, corals, sponges and other marine substances. He has promised to lend me some of his sponges and what else may be curious in any way.' [Edinburgh University Library, MS]

Evidently Ellis made use of Fothergill's collection over a long period, since he and Solander examined Fothergill's corals in 1774.

Fothergill's collections were eventually sold and became largely untraceable. Whitehead (1978: 70, 82) dated the sale at 1781 and stated the price to be £1,100. Only a few of the corals remain (p. 55). Whitehead stated 'Fothergill undoubtedly had many Cook specimens', which were almost certainly seen by both Ellis and Solander when preparing their account. Durant & Rolfe (1984) concurred and drew attention to the existence of some of the Fothergill corals in William Hunter's collection in Glasgow. They were partly listed by Young (1877) and Kerr (1910), and a more complete list is given in Table 2. Indeed, surviving letters indicate that many of Fothergill's corals were being examined by Solander at the BM for Ellis in November 1774, when Solander was writing that part of the book (p. 43); and the published caption to plate 60 states that the illustrated specimen of the crown-of-thorns starfish, today known as *Acanthaster planci* (Linnaeus, 1758), 'was brought from Batavia by Captain W. Webber, and is in the possession of Dr. Fothergill'. Thus many of the specimens coming into Fothergill's possession became Ellis & Solander types (that of *A. planci* was not a type, the species having been described earlier by Linnaeus).

It is curious that Banks and Solander, who had jointly collected the corals originating from the *Endeavour*, did not incorporate them into the BM collection. Whitehead also stated that 'Hunter intended selling Fothergill's duplicate shells, flies and perhaps corals after they were arranged and labelled by his assistant'. Maybe that is why only a fraction of the total complement of coral species that there might have been survives. The scant evidence suggests that many of the Ellis & Solander *Madrepora* types, collected by Banks and Solander on James Cook's HMS *Endeavour*, were eventually sold as curios!

Sales of Ellis specimens

The bulk of Ellis's collections, including some corals, was sold by auction on 10 June 1791, by the London dealer Hutchins. It is likely that species illustrated in both books (Ellis, 1755, Ellis & Solander, 1786) were involved. Lettsom (1786) recorded that Hunter bought 'Ellis's corals . . . and other curious subjects of natural history' for £1,500, an enormous amount of money. He commented: 'his corals, from which Ellis . . . delineated his system, and created a new species of animal beings . . . was the foremost in Europe. It included some corals from Cook's voyages. These and other curious objects of natural history were purchased by Dr Hunter for £1500.'. (Lettsom, 1784, vol. 3: liii; Lettsom, 1786: 55). Lettsom implied that many of these were Fothergill coral specimens and were Ellis & Solander types, and this seems to have been so. We have no evidence that any *Endeavour* corals passed into Ellis's hands, although since Ellis and Solander were friendly this is a possibility. Only a few survive (Young, 1877; Kerr, 1910; see also Table 2).

By implication, A. C. Wheeler (in Chalmers-Hunt, 1976: 15) rated the Ellis collection among the few foremost in zoological importance, other than those of mollusc shells, to be sold by auction during the long period 1700–1972. A copy of the Ellis sale catalogue (Hutchins, 1791) preserved in the Prints & Drawings Room of the British Museum, London, has annotations giving many of the buyers and the prices paid. The sale comprised 107 lots. Number 97, annotated as purchased by the London dealer George Humphreys (1739–1826) for seven guineas, included 'seven large glazed frames, six of them in a mahogany case, with shelves and folding doors, in which are arranged a very fine and extensive collection of corals and corallines, sponges, &c. from which the figures and descriptions in the History of Zoophyte [Ellis & Solander, 1786] were taken; most of the specimens, which are chosen ones, are labelled, either by Mr. Ellis or Dr. Solander; . . .' Nine of the lots (11, 25, 42, 47, 61, 74, 79, 86, 93) included corals or other zoophytes, some 33 specimens of which were specifically named comprising 22 identified species of *Madrepora*, all species described in the 'Zoophytes'. Lot 93 consisted of two specimens: 'Madrepora protrusa [lapsus for *M. pertusa*], from the South Seas; and madrepora axillaris, both kinds extremely scarce. – See Ellis Zoophyte [sic], the descriptions and figures in which were taken from these specimens.'. An H in the margin of the BM copy of the sale catalogue suggests that these were purchased by Humphreys, who was identified by annotations of his full name at other places in the copy. Ellis's six-drawer cabinet and the seventh, separate, case evidently contained numerous specimens from which the illustrations were prepared and many would no doubt qualify for type status.

Lot 98 in the Ellis Sale was: 'A parcel of sketches and drawings of corallines, sponges, and other zoophyte', sold to John Hunter for five guineas. Four other lots (100, 101, 102, 104) of drawings, including four by G. D. Ehret, were also purchased by him for £1 2s 6d. These drawings are now in the Royal College of Surgeons of England, London (Harmer, 1931*b*) where they were examined jointly by the present authors (p. 51). Included among this magnificent collection of drawings of scleractinians, sponges, hydroids and other zoophytes were examples of the work of Roberts, Taylor and Ehret.

Humphreys also bought from the Ellis sale Lot 30 'A wainscott box containing a very large collection of fuci, or sea-weeds, the whole of which are arranged by Mr. Ellis' (MS note in BM copy of Hutchins, 1791). Its subsequent fate is unknown to us. The coralline algae from Ellis's collections were also sold at this sale, and can no longer be traced (Woelkerling & Irvine, 1986). Other lots in the Ellis sale included various 'zoophyte' items, almost certainly with a few types, but the buyers are not recorded in the BM copy.

George Humphreys was active for many years (summary in Whitehead, 1975: 72). Some clue as to the subsequent fate of some of the Ellis specimens might be hoped for in following his activities after the sale. A MS note by W. Clift, Curator at the Royal College of Surgeons, London, dated 16 June 1830, states that George Humphreys's collection was bought by 'Mr Sowerby, Dealer & Auctioneer, and afterwards sold at various sales and times'. He continues with a note on the fate of a specimen of *Encrinus* from the Ellis sale in 1791 [Royal College of Surgeons of England, London, *Hunterian Drawings* vol. 1, f. 11].

Whitehead (1975) listed some of Humphreys's purchases at the Ellis sale but corals were not among them. In 1786 Humphreys bought at the 'Portland Sale' (Skinner, 1786); and in 1797 he conducted a sale for a Paris dignitary, C. A. de Calonne. In fact, the only sale catalogue ascribed to G. Humphreys in the British Library *Catalogue of Printed Books* was that of the de Calonne sale (Humphreys, 1797). Humphreys's name does not appear on the title page and the reasons for associating the catalogue with him are not known to us. The 84-page catalogue included a section of corals (*Madrepora*), lots 1202–1242 inclusive, of which 18 (or 19: lot 1213 is problematical), that is just under half, were identified in the catalogue using the Ellis & Solander book. For example:

> 'Lot 1202 *Madrepora cyathus* Mediterranean. Ell. & Sol. Zooph., pl. 28, fig. 7.' [*Caryophyllia cyathus* (Ellis & Solander)]
>
> 'Lot 1204 *Madrepora fungites* E Indies.' [*Fungia fungites* (L.)]

Only the first of these species was described as new by Ellis & Solander, and no other of the 41 listed specimens were from their respective type localities (all but two had localities listed). The task of determining whether these might have been Ellis & Solander specimens is made difficult since in many cases Solander did not state the type locality in the book, but a preliminary impression is that the material in Humphreys's de Calonne sale did not include relevant specimens. A later sale of de Calonne artefacts in the same year (King, 1801), although comprising largely mollusc shells, 'zoophytes' and other marine curios, did not have a systematic arrangement such as might reflect the dispersal of a scientific collection such as Ellis's.

The Portland Catalogue

Another sale catalogue giving a small amount of evidence about the fate of specimens relating to both Ellis (1755) and Ellis & Solander (1786) is the so-called *Portland Catalogue* (Lightfoot, 1786). The catalogue records the sale of the enormous collection of marine invertebrates, and of numerous art treasures and the like, following the death of Margaret Cavendish, Dowager Duchess of Portland. Evidently Ellis had occasional access to it. Thus, he wrote to David Skene (14 July 1786):

> 'I have sent you a sketch of a New Barnacle which the Duchess of Portland has desired me to get drawn . . .' [Edinburgh University Library, MS]

There are also indications in the text (Ellis & Solander, 1786) that the Duchess's collections were examined (for example *Gorgonia exserta* Ellis & Solander, their pp. 87–88).

The *Portland Catalogue* is long and was prepared skilfully. The Rev. John Lightfoot is now thought to have been the author (discussion in Dance, 1962; Kay, 1965; see also Rauschenberg, 1964, Rehder, 1967, and comments on p. 38). Many of the 4156 lots were corals, and a large proportion was identified thus, citing the Ellis & Solander book:

> 'Lot 263 *Madrepora cinarescens*. Ell. Zooph. Tab. 43' [*Turbinaria cinarescens* (Ellis & Solander)], and '*Madrepora damicornis*, L.' [*Pocillopora damicornis* (L.)].

Manuscript annotations in a British Library copy name the buyers and the prices paid – in this case 'Sykes', for 4s 6d. Most of the zoophyte entries follow this form; but three state definitely that the item was an illustrated specimen, viz:

> 'Lot 3610 A most curious and elegant white Coral, of a globose form, with delicate angulated cells, *figured in Ellis Zooph. tab. 54. fig. 3. and by him named* Madrepora Retepora [*Alveopora retepora* (Ellis & Solander)]. *It is extremely rare.*' [Italics original. Bought by Humphreys, 12s 0d.]
>
> 'Lot 3747 The body, with the rays folded up, of a curious and rare species of

> Encrinus [*Encrinus lilliformis* Lamarck], *described by Rosinus, and figured in Ellis' Corall.* [i.e. Ellis, 1755] *pl. 37. fig. K* with great part of it's stem, imbedded in a calcareous stone, replete with marine bodies of this and other kinds.' [Italics original; buyer not recorded; £1 5s 0d.]
>
> 'Lot 3804 A very curious un-named species of Madrepora, *figured in Ellis Zooph.* tab. 32 fig. 1' [*Madrepora tibicina* Ellis & Solander, 1786 =*Hoplangia durotrix* Gosse; see p. 52). [Italics original; no buyer entered, but Humphreys bought lots 3803 and 3805; 7s 0d.]

The published list of the prices fetched and the names of the buyers at the 'Portland Sale', for convenience ascribed to the auctioneer, Skinner (1786), gives the information shown above under these three lots. The same prices and buyers are entered in MS in two BL copies of the *Portland Catalogue* except that in one of them no price is given for lot 3804. However, an MS note in the other, and also in a copy of the catalogue in Cornell University library, records the price as 7s 0d, as entered in Skinner's published sale list.

Thus Ellis & Solander was clearly used extensively by Lightfoot in preparing the catalogue, which followed it in the same year. It seems unlikely that during his apparent repeated comparison of the Portland specimens with the Ellis & Solander plates that Lightfoot would have overlooked the possibility of very much more of the illustrated material being included. The marvellous Ellis & Solander book had just appeared, and illustrated items in the sale would be sought after: hence the italics in the entries for lots 3610, 3747 and 3804. One can imagine that Lightfoot would have been on the look-out for such items. But it seems that he recorded only these three, implying that this was all the Ellis & Solander material included in the Duchess of Portland's collections at the time of her death. We know also that Solander probably helped compile the *Madrepora* entries to the *Portland Catalogue* (Banks, in Rauschenberg, 1964), making it still less likely that opportunities were missed of indicating which specimens were mentioned in Ellis & Solander (1786).

Sale of Ellis's library

Ellis's library, along with that of Solomon Dayrolles, was sold by auction in 1786 (Robson, 1786). Though the two lots of books were not distinguished in the auction catalogue, it is evident that Ellis's library included many important works today regarded as rarities. Three Ellis works were included: a copy of Ellis, 1755, Lot 1806, asking price a guinea; a copy of Ellis & Solander, 1786, ascribed to Ellis alone, in boards, with 63 plates, Lot 7940, askng price 15s 0d; and a second copy of Ellis & Solander (1786), with coloured plates, in boards, Lot 8781, no asking price stated.

Much can be deduced from the catalogue and from these entries. The catalogue is dated '1786', no day or month being indicated; though the sale was advertised in *The Times* for 6 May of that year. It was clearly impossible for the two copies of Ellis & Solander (1786) to have been acquired by Ellis, who died in 1776. It is conceivable that the copies came from Dayrolles' library. But there is no evidence that he collected natural history literature and most biological items in the catalogue are not duplicated, indicating a single source which would certainly have been Ellis. The inclusion of the copies of the 1786 book, however, throws doubt on the possibility that the sale copy of Ellis (1755) was genuinely Ellis's (and the same as that now in Glasgow and which was perhaps bought by Hunter (p. 58)). It is possible that the auctioneer added books from other sources to the sale, or held back others of either collection from it. Thus, although the catalogue undoubtedly represents the dispersal of Ellis's books it cannot be taken as a definitive list of the natural history works he owned, even if any of Dayrolles' could certainly be distinguished. The catalogue does confirm however, that copies of the 1786 book had only 63 plates; and suggests too that coloured copies were included in the original issue.

William Hamilton

The possibility that specimens sent from Naples in 1779 by Sir William Hamilton were described by Solander in the book has been discussed already (p. 46). The specimens were mentioned also by Miller (1973: 86).

Ellis's hydroid collection and other material

Sadly it is almost certain that, with the exception of a single non-type specimen, and of the material given by Ellis to Linnaeus and preserved in the collections of the Linnean Society of London, all of Ellis's hydroid collection is lost. At an unknown date some of it became part of the Hunterian Museum of the Royal College of Surgeons of England, London (Royal College of Surgeons of England, 1830, 1860; Harmer, 1931*a*, *b*). This raises the possibility that the manuscript entry against lot 97 (the zoophyte cabinet) in the British Library copy of the Ellis sale catalogue (Hutchins, 1791) should have read Hunter, and not Humphreys! Lot 98, the drawings, was recorded in the BL copy as bought by Hunter. It is tempting to think that Hunter, during his lifetime, acquired the Ellis collections to accompany the drawings. Hunter's collections, including large numbers of Ellis zoophytes, passed to the Royal College of Surgeons of England (then called the Corporation of Surgeons) in 1799 or 1800 (Anon. (3), 1799). Either then or on another occasion the Ellis non-coralline zoophytes also went there.

Many of the hydroid, sponge and bryozoan collections survived until the Second World War (Royal College of Surgeons of England, 1971) when they were destroyed by a bomb along with other priceless relics including almost all the known skeletons of the extinct Tasmanian aborigines. PFSC was told that the sole surviving hydroid specimen was a colony of *Nemertesia ramosa*, regd no. XI (Cornelius, 1975*a*: 267, footnote), preserved in spirit and lacking original documentation. We have not checked the authenticity of this specimen.

A note by S. F. Harmer bound in with the Ellis drawings in the Royal College of Surgeons, London (p. 51), gives clues to the identities of a few of the specimens lost at that time. He states that the catalogue by Richard Owen (Royal College of Surgeons, 1860) implied that about eight specimens undoubtedly came from Ellis: *Corallina* (Royal College of Surgeons, 1860, p. 10, no. 41, and p. 140, no. C37); *Sertularia operculata* (p. 134, no. C6); *Isis hippuris* (p. 173, no. C23 'Hunterian'); 'specimen from which Mr Ellis' drawing was made' (p. 170, no. 213, considered by Harmer to have been illustrated in *Phil. Trans.* vol. 50, pl. 3 [or 111]); unnamed (p. 273, no. E3, p. 255, no. E16 'Hunterian', p. 257, no. E20 'from Mr Ellis' collection'). The labels from the first and second, *Corallina*, were said to have been written by Ellis. All this material was probably destroyed in the Second World War (see above).

Other references to the fate of the Ellis hydroid collections are similarly unrewarding. Thus Boulger (in Stephen, 1889, entry under John Ellis) stated that some Ellis hydroid material was deposited in the British Museum – possibly the four wall cases mentioned already (p. 56). All natural history specimens were transferred from there to the British Museum (Natural History) from 1882 onwards. PFSC has curated the cnidarian collections in the Zoology Department there for some eighteen years and, excepting a single scleractinian specimen probably described by Solander (Fig. 10), has found no trace of any material described by Ellis or Ellis & Solander from any cnidarian order. Indeed, Gray (1848: 71), in a review of the British cnidarian specimens in the BM, listed no specimens of '*Sertularia evansi*' Ellis & Solander (p. 28). Gray included the species only on faunistic grounds, from Ellis & Solander's published record, and it is clear that he saw no specimen.

No Ellis hydroid specimens accompany the 20 Ellis & Solander coral specimens listed by Kerr (1910) and others (see also Table 2) in the collections of the Zoology Department, Glasgow University (Dr C. H. Brock & Miss E. Macartney, pers. comm.

Ellis's herbarium not at Lund

Mrs Linda Irvine kindly told us that Stafleu & Cowan's (1976: 743) assertion that the 'Ellis Herbarium' was bought by the Herbarium of Lund University, Sweden, in 1905, was probably incorrect. She contacted both Botany and Zoology Curators in Lund and no record of such an acquisition could be found. Dr Stafleu kindly told PFSC (in litt.) that he was unable to confirm that the collection went to Lund, and his published report unfortunately seems wrong.

The unidentified figures of Ellis & Solander's *Zoophytes*

There are figures on Ellis & Solander's (1786) Plates 26, 32, 41, 47, 51 and 63 for which the editor of the posthumous book evidently found no captions 'in Mr. Ellis's papers' (e.g. caption to pl. 26; see also p. 49). Lamouroux (1821) reprinted the plates from the work, mostly from the original engravings, and identified these unlabelled figures. His identifications are indicated below. We have added corrections based on our own or on other opinions. See also Table 1.

PLATE 18

Fig. 1 *Eunicea limiformis* (see Lamouroux, 1821: 36)
Fig. 2 *E. clavaria* (see Lamouroux, 1821: 36)
Fig. 3 *Plexaura friabilis* (see Lamouroux, 1821: 35)

PLATE 26

Fig. 1 *Hornera frondiculata* (Lamarck, 1816). (Lamouroux, 1821: 106) = *Millepora tubipora* Ellis & Solander (1786: 139) = 'corail blanc' Ellis (1755: 95, pl. 35, figs B, b) (see Borg, 1944).
Fig. 2 *Retepora cellulosa* (Linnaeus, 1767). (Lamouroux, 1821: 106) = *Millepora foraminosa* Ellis & Solander (1786: 139) = 'Retepora marina' Ellis (1755: 72, pl. 25, figs D, d, F) (see Harmer, 1933).
Figs 3–4 *Distichopora violacea* (Pallas, 1766) = *Millepora violacea* Ellis & Solander (1786: 140) (see Cairns, 1983). Stylasterina.
Fig. 5 *Krusensterna verrucosa* (Ellis & Solander, 1786). (Lamouroux, 1821: 41, 107, 'fig. mal') = *Millepora verrucosa* Ellis & Solander (1786: 138) (see Harmer, 1933).

PLATE 32

Fig. 1 *Hoplangia durotrix* Gosse, 1860. Synonymy as follows:
Madrepora tibicina Ellis & Solander, 1786: 152 ('nomen oblitum').
?—— *tuba* 'or trumpet coral Ellis MSS' Lightfoot, 1786: 9.
'A very curious un-named species of Madrepora, figured in Ellis Zooph., tab. 32, fig. 1' Lightfoot, 1786: 177.
Caryophyllia flexuosa Lamarck, 1816: 227.
Caryophyllia flexuosa Lamouroux, 1821: 49, pl. 32, fig. 1.
Hoplangia durotrix Gosse, 1860: 338, text-fig., pl. 10, fig. 9; Zibrowius, 1980: 123, pls 64, 65.
Coenopsammia flexuosa Milne Edwards and Haime, 1860: 126.

The lack of an illustration with Ellis & Solander's brief description of their *M. tibicina* has made its identity uncertain, and the absence of any explanation of their Plate 32, fig. 1, has added to the uncertainty. Esper (1790: 265), in his review of the *Zoophytes* which had just reached him, thought that the figured coral was the same as his *M. fascicularis* (=*Cladocora caespitosa*). Lamarck cited Ellis & Solander's figure ('optima sed absque descripta') under his *Caryophyllia flexuosa* (non *M. flexuosa* Linnaeus). Lamouroux (1821) followed Lamarck. Milne Edwards and Haime cited the figure under *Coenopsammia flexuosa* ('*Madrepora flexuosa* Solander & Ellis, Nat. Hist. Zooph., tab. 32, f. 1'). Their description is that of the coral on Ellis & Solander's plate 32, figure 1, but it is clearly not a *Coenopsammia* (*Tubastraea*). The figure in question on plate 32 is a very good one of a coral identical with *Hoplangia durotrix* by comparison with Zibrowius' photographs of examples of that species, which is certainly the coral described by Ellis & Solander under the name *Madrepora tibicina*. Lightfoot's '*Madrepora tuba* or trumpet coral Ellis MSS' may have been changed by Solander to the more appropriate *tibicina*. Young (1877), in his list of figured Ellis & Solander corals in the Hunterian Museum, noted '2. Pl. 32, fig. 1?'. Kerr's (1910) catalogue of the Hunterian specimens listed '*M. tibicina* (?) E. & S. The specimen may be of the species figured on Plate 32, fig. 1'; but our colleague Dr J. E. N. Veron, Australian Institute of Marine Science, searched for the specimen in 1980 and considered it missing; and Dr P. E. P. Norton also did not report it (in litt. to JWW; Table 2).

Fig. 2 *Lophelia prolifera* (Pallas, 1766). Ellis & Solander, 1786: 153.

Figs 3–5 *Cladocora caespitosa* (Linnaeus, 1767). Identified by Lamouroux (1821: 50) as *Caryophyllia ramea* (Pallas), and as *Cladocora caespitosa* by Zibrowius & Grieshaber (1977: 380).

Figs 6–8 Figures 6–8 were copied from Donati (1753) with no explanation. Lamouroux (1821: 107) remarked of figs 6–8 'Je ne les crois pas exactes' and (p. 50) '. . . je suis tenté de les regarder comme un effet de l'imagination de l'auteur'.

PLATE 41

Fig. 3 *Cellepora spongites* (Pallas, 1766). (Lamouroux, 1821: 2). = *Eschara spongites* Pallas = *Millepora spongites* Ellis & Solander (current name *Stylopoma spongites* – see Thomas & Hastings, 1974).

Fig. 4 *Porites conglomerata* (Esper, 1795). (Lamouroux, 1821: 61). Ellis & Solander's figure is poor and may not even represent a specimen of *Porites*. A photograph of Esper's specimen made by Dr Georg Scheer suggests *P. lobata* (Dana, 1846).

PLATE 47

Figs 1–2 *Porites porites* (Pallas, 1766). Fig. 4 shows details of calices.

Fig. 3 *Astrea* (ex Lamouroux, 1821: 108). 'Impossible à déterminer et à décrire'. It is a worn corallum of *Favites*.

PLATE 51

Fig. 1 *Colpophyllia natans* (Houttuyn, 1772). Identified by Lamouroux (1821: 55) as *Meandrina pectinata* Lamarck, 1801, and also plate 48, figure 1, which is *Meandrina meandrites* (Linnaeus). But plate 51, figure 1, is not this but the *amaranthus* form of Houttuyn. Esper (1790: 293) included both figures 1 and 2 in *Madrepora natans*, recognizing that figure 2 represented a worn specimen.

Fig. 2 *Colpophyllia natans* (Houttuyn, 1772). = *Madrepora gyrosa* Ellis & Solander (1786), the type species of *Colpophylla* Milne Edwards & Haime (1848).

PLATE 54

Figs 1–2 *Spongia cellulosa* (see Lamouroux, 1821: 29).

PLATE 59

Figs 1–3 *Spongia othaitica* (see Lamouroux, 1821: 29).

Fig. 4 *S. ficiformis* (see Lamouroux, 1821: 29).

PLATE 63 *Pavona cristata* Ellis & Solander (1786). Synonymy as follows:

Madrepora agaricites Müller, in Knorr, 1766: 25, pl. AX, fig. 1.
Madrepora cristata Ellis & Solander, 1786: 158, pl. 31, figs 3–4; Esper, 1790: 292.
Madrepora agaricites Linnaeus *var.*, Esper, 1790: 292.
Madrepora boletiformis Esper, 1795: 61, 84, pl. 56.
Pavona cristata Lamarck, 1801: 372 (pl. 63 = protograph); Lamarck, 1836: 377.
Pavona agaricites (sensu Linnaeus) Lamarck, 1816: 239 (in errore).
Agaricia agaricites Milne Edwards & Haime, 1860: 81 (in part).
Lophoseris boletiformis Milne Edwards & Haime, 1860: 66.
Lophoseris knorri Milne Edwards & Haime, 1860: 68 (nom. nov. for *Madrepora agaricites* Knorr, 1766, pl. AX, fig. 1). non *Madrepora agaricites* Linnaeus, 1758: 795; Pallas, 1766: 287; Ellis & Solander, 1786: 159; Gmelin, *in* Linnaeus, 1791: 3758; Esper, 1789: 150, pl. 26.

The specimen figures on plate 63 has previously been identified as *Madrepora agaricites*, first by P. L. S. Müller in his descriptions of Knorr's corals in 1766, the same year that Pallas fixed Linnaeus's species on Seba's (1758) plate 110, figure 6c. This is the coral today taken as typical *Agaricia agaricites*, and is quite different from Knorr's figure which shows a *Pavona* as that genus is now understood. Esper (1790) identified Plate 63 with *M. cristata* Ellis & Solander, but later (Esper, 1795) thought that it was close to his *M. boletiformis*. Lamarck (1801) named it a new species, *Pavona cristata*, one of the two species originally included by him in the genus *Pavona* Lamarck, 1801, which he introduced. Lamarck noted that he doubted that it was the same as Linnaeus's *M. agaricites* but did not mention Ellis & Solander's *M. cristata*. In 1816 Lamarck referred Ellis & Solander's plate 63 to his *Pavona agaricites* (Linnaeus), an error followed by Lamouroux (1821). In the 1836 edition of Lamarck's work, under *Pavona cristata*, only Knorr's figure was cited (Lamarck, 1836: 377), and plate 63 was cited under *P. agaracites* (Lamarck, 1836: 376). Klunzinger (1879: 73, 74) considered that *M. cristata* was identical with *M. cactus* Forskål, a conclusion that was followed by Vaughan (1918: 132). But Crossland (1941) described and figured one of Forskål's syntypes of *M. cactus*, showing that it was not the same as Ellis & Solander's *M. cristata*. The conclusions reached here are that plate 63 is another illustration of *M. cristata* Ellis & Solander, and that the illustrated specimen later became included under the original description of *Pavona cristata* Lamarck, 1801. The latter species is regarded type species of *Pavona* (for example by Veron & Pichon, 1979: 6); and *M. boletiformis* Esper and *Lophoseris knorri* Milne Edwards & Haime are regarded conspecific with *P. cristata*.

Conclusion

When Ellis & Solander's (1786) book finally appeared it was excellent both technically and scientifically. Indeed, Ellis told in a letter to Linnaeus (in Smith, 1821) how he had over a number of years patiently sought the best artists and engravers available (see pp. 52–54 for identification of many of the artists and engravers). Lamouroux's (1821) reprinting of the 63 originally-issued plates 35 years later is itself testimony, as is the respect with which all subsequent zoophyte workers have mentioned this splendid book. Indeed, no subsequent publication has included first descriptions of species from such a variety of cnidarian and other zoophyte orders, and the work underpins fields of study sufficiently distinct that today they are virtually separate disciplines.

The book was partly conceived and written under the influence of the still young British Museum, and represents one of the first fruits of that institution and indeed of publicly-financed biology. The British Museum and its now century-old daughter institution, the British Museum (Natural History), have become two of the most respected scholarly institutions in the world. It is not unreasonable to suggest that the scientific excellence of Ellis & Solander's book contributed to the foundations of the scholarly traditions of these places. Doubtless their history would have been much the same without this book. But it is sobering nonetheless to reflect that without the timely intervention of Ellis's daughter, Martha Watt, Ellis & Solander's magnificent book might have passed into oblivion.

Acknowledgements

We thank Dr B. R. Rosen of the Palaeontology Department, British Museum (Natural History) (BMNH), for assistance in initially locating and examining the unique copy of Ellis & Solander's *Zoophytes* and for advice and comments on parts of the manuscript. We especially thank Alwyne Wheeler, Zoology Department, BMNH, for giving scholarly advice on many points, both general and specific, continuously over many years, and for criticizing the manuscript at both early and late stages. The paper is immeasurably the richer for his generous input. We are grateful also to J. B. Marshall for comments on the 'manuscript captions' reproduced herein (Fig. 8); and to E. H. Cornelius, lately Librarian, and Miss E. Allen, Curator, both of the Royal College of Surgeons of England, for access to the Ellis drawings and discussions about Ellis's collections. We are indebted to the following for permission to reproduce the illustrations: the Trustees of the British Library (figs 2–8); the President and Council of the Royal College of Surgeons of England (fig. 9); and the Trustees of the British Museum (Natural History) (figs 1, 10).

PFSC is grateful for fruitful discussion with the following also: Dr Julius Groner, History Department, Loyola University, Chicago, for detailed discussions about John Ellis, for the opportunity of seeing an advance copy of his important doctoral thesis and for copies of other manuscript material; R. E. R. Banks, acting Librarian to the BMNH, for advice; Professor Patricia R. Bergquist and Miss S. M. Stone for information about a surviving Ellis & Solander sponge specimen in the BMNH collections; G. D. R. Bridson, formerly Librarian to the Linnean Society of London, for initial help with the Ellis manuscripts; H. B. Carter, for scholarly discussion about Banks and Solander; Mrs J. Diment, formerly Botany Librarian to the BMNH, for information and advice about Ellis, Solander and Banks; Miss P. L. Cook, lately of the Zoology Department, BMNH, for advice on bryozoan taxonomy; Dr P. J. P. Whitehead, Zoology Department, BMNH, for detailed advice on a range of historical aspects; Mrs L. M. Irvine, Botany Department, BMNH, for comments on coralline alga taxonomy; Dr C. H. Brock and Miss E. Macartney, Department of the History of Science, and P. K. Escreet, University Librarian, all of the University of Glasgow, for advice on material held in their respective institutions; B. Hartard, compositor at the *Daily Telegraph*, for advice on printing terminology; E. M. B. King, Department of Preservation Services, British Library, for comments on the binding of Banks's copy; and finally to his family, in whose time much of his contribution to the paper was written.

JWW is similarly grateful to the following: Dr Walter C. Jaap, Marine Research Laboratory, St Petersburg, Florida, for comments on Ellis & Solander's plate 63; Dr P. E. P. Norton, Zoology Department, Glasgow University, for a revised list of the Ellis & Solander type and figured specimens now in that Department; and to the staff of the History of Science Library at Cornell University for access to many early natural history books.

Tables

Table 1 Summary of identifications of animals and plants on Ellis & Solander's (1786) previously unpublished plates 64–69 (present Figs 2–7). All are Scleractinia unless otherwise indicated. An asterisk (*) denotes that there are no data on the page of manuscript captions by Dryander (present Fig. 8).

Plate 64
1–2 = *Cellaria ternata* Ellis & Solander, 1786: 30 = *Tricellaria ternata* (Ellis & Solander) [Bryozoa]
3–4 = *Sertularia spicata* Ellis & Solander, 1786: 58 = *Batophora oerstedii* J. Agardh, 1854 [Algae]
5–6 = *Sertularia evansi* Ellis & Solander, 1786: 58–59 = *Synthecium evansi* (Ellis & Solander) [Hydrozoa]
7 = *Corallina pinnata* Ellis & Solander, 1786: 117 = *Liagora pinnata* Harvey, 1853 [Algae]
8 = *Corallina loricata* Ellis & Solander, 1786: 117 = *Corallina officinalis* Linnaeus, 1758 [Algae]

Plate 65
1–2 = *Madrepora mammillaris* Ellis & Solander, 1786: 154 = *Oculina banksi* Milne Edwards & Haime, 1850
3–4 = *Madrepora oculata* Linnaeus, 1758; Ellis & Solander, 1786: 154

Plate 66
1–2 = *Madrepora erubescens* Ellis & Solander, 1786: 165 = *Stylaster erubescens* (Pourtalès, 1868) [Hydrozoa]
3–4 = *Madrepora rosea* Pallas: Ellis & Solander, 1786: 155 = *Stylaster rosea* (Pallas, 1766) [Hydrozoa]

Plate 67
1 = *Madrepora agaricites* Linnaeus, 1758: Ellis & Solander, 1786: 159 = *Agaricia agaricites* (Linnaeus, 1758).
2 = *Madrepora sinuosa* Ellis & Solander, 1786: 160 = *Isophyllia sinuosa* (Ellis & Solander)

Plate 68
1 = *Madrepora spongiosa* Ellis & Solander, 1786: 164 = *Montipora foveolata* (Dana, 1846)
*2 = *Stylocoeniella armata* (Ehrenberg, 1834)
*3 = *Psammocora contigua* (Esper, 1795)
*4? = *Madrepora botryotes* Ellis & Solander, 1786: 172? = *Goniopora*
5 = *Madrepora papillosa* Ellis & Solander, 1786: 169 = *Acropora cuneata* (Dana, 1846)

Plate 69
1 = *Montipora verrucosa* Lamarck, 1816
2 = *Cyphastrea chalcidicum* (Forskål, 1775)
3 = *Acropora cuneata* (Dana, 1846)
4 = *Psammocora contigua* (Esper, 1795)

Table 2 Type and figured specimens of corals described in Ellis & Solander's *Natural history of . . . zoophytes*, 1786, preserved in the Hunterian Museum, University of Glasgow. From a list prepared in 1978 by P. E. P. Norton, University of Glasgow, with current names appended by J. W. Wells in parentheses. A single Ellis & Solander scleractinian specimen is preserved in the BMNH collection (see caption to present Fig. 10).

PLATE 29, p. 151	*Madrepora anthophyllites* Type and 2 syntypes, and another specimen. [*Pourtalosmilia anthophyllites*, f. Zibrowius, 1976]
31, figs 5–6, p. 151	*M. flexuosa*. [*Cladocora caespitosa* (L.)]
34, p. 152	*M. angulosa* Pallas. [*Mussa angulosa* (Pallas)]
35, p. 153	*M. carduus*. Type. [*Mussa angulosa* (Pallas)]
38, p. 155	*M. ramea* L. Specimen figured by E. & S.? [*Dendrophyllia ramea* (L.)]
39, p. 156	*M. aspera*. Type. [*Echinophyllia aspera* (E. & S.)]
40, p. 157	*M. undata*. Piece of type. [*Agaricia undata* (E. & S.)]
41, figs 1–2, p. 157	*M. ampliata*. Type [*Merulina ampliata* (E. & S.)]
43, p. 157	*M. cinarescens*. Type. [*Turbinaria cinarescens* (E. & S.)]
45, p. 159	*M. pileus* L. [*Herpolitha limax* (Esper)]
46, fig. 1, p. 163	*M. daedalea* (non Forskål). [*Platygyra rustica* (Dana)]
47, fig. 4, p. 166	*M. areolata* L. [*Manicina areolata* (L.)]
48, fig. 2, p. 162	*M. phrygia*. Type. [*Leptoria phrygia* (E. & S.)]
50, fig. 2, p. 162	*M. abdita*. Type. [*Favites abdita* (E. & S.)]
52, p. 164	*M. foliosa*. [*Montipora foliosa* (Pallas)]
53, fig. 1, p. 169	*M. annularis*. Type. [*Montastraea annularis* (E. & S.)]
53, figs 5–6, p. 166	*M. faveolata*. Type. [*Montastraea annularis* (E. & S.)]
55, fig. 1, p. 166	*M. rotulosa*. Type. [*Plesiastrea annuligera* (E. & S.)]

Not found in 1978, but listed by Young (1877) and Kerr (1910):

56, figs 1–3, p. 167	*M. interstincta*. [*Heliopora coerulea* (Pallas)]
57, p. 171	*M. muricata*. [*Acropora muricata* (L.)]

References

The letters printed in **bold** at far right following each reference indicate its approximate subject areas and serve as a crude bibliographic index, as follows: **A** algae, **Ba** Sir Joseph Banks, **Bi** bibliography, **Br** Bryozoa, **C** Cnidaria other than Hydrozoa and Scleractinia, **Ck** James Cook, **E** John Ellis, **F** John Fothergill, **G** geology, **Hi** historical and biographical, **Hu** William Hunter, **Hy** Hydrozoa, **Lig** Lightfoot, **Lin** Linnaeus, **Mi** microscopy, **Mu** museum collections, **O** other animal and plant groups and other topics, **P** Portland Catalogue and collections, **Sc** Scleractinia, **Sk** David Skene, **Sl** Sir Hans Sloane, **So** Daniel Solander, **T** Abraham Trembley, **W** Gilbert White, **Z** 'zoophytes'.

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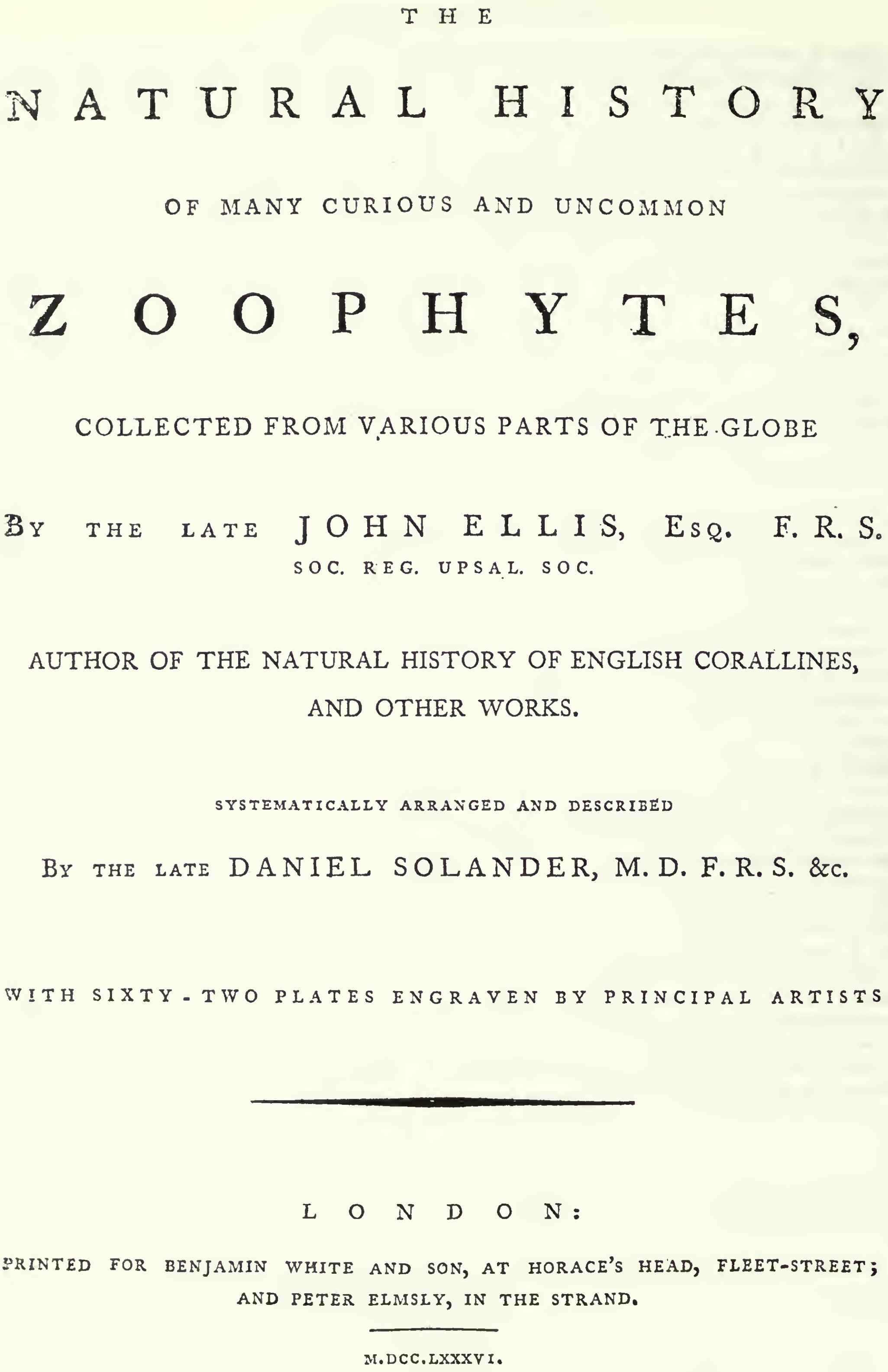


THE

NATURAL HISTORY

OF MANY CURIOUS AND UNCOMMON

ZOOPHYTES,

COLLECTED FROM VARIOUS PARTS OF THE GLOBE

BY THE LATE JOHN ELLIS, ESQ. F.R.S.
SOC. REG. UPSAL. SOC.

AUTHOR OF THE NATURAL HISTORY OF ENGLISH CORALLINES,
AND OTHER WORKS.

SYSTEMATICALLY ARRANGED AND DESCRIBED

BY THE LATE DANIEL SOLANDER, M. D. F. R. S. &c.

WITH SIXTY-TWO PLATES ENGRAVEN BY PRINCIPAL ARTISTS

LONDON:

PRINTED FOR BENJAMIN WHITE AND SON, AT HORACE'S HEAD, FLEET-STREET;
AND PETER ELMSLY, IN THE STRAND.

M.DCC.LXXXVI.

Fig. 1 The title page from Ellis & Solander's '*Zoophytes*'. For comments see text (p. 36).

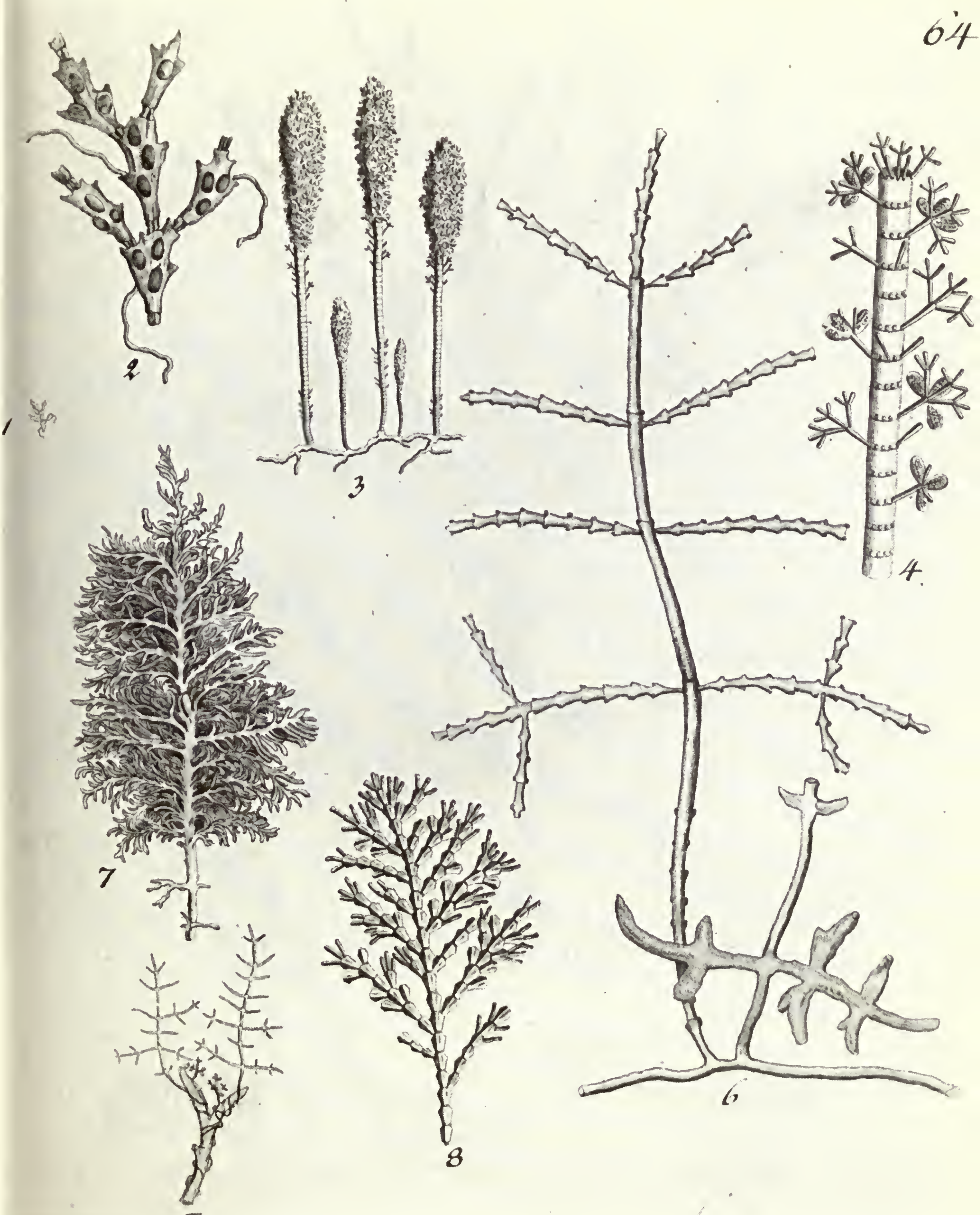


Fig. 2 The unpublished plate 64 from Ellis & Solander (1786). For identification of the species see Figure 8 and the text (pp. 27–30, 66). See also Figure 9.

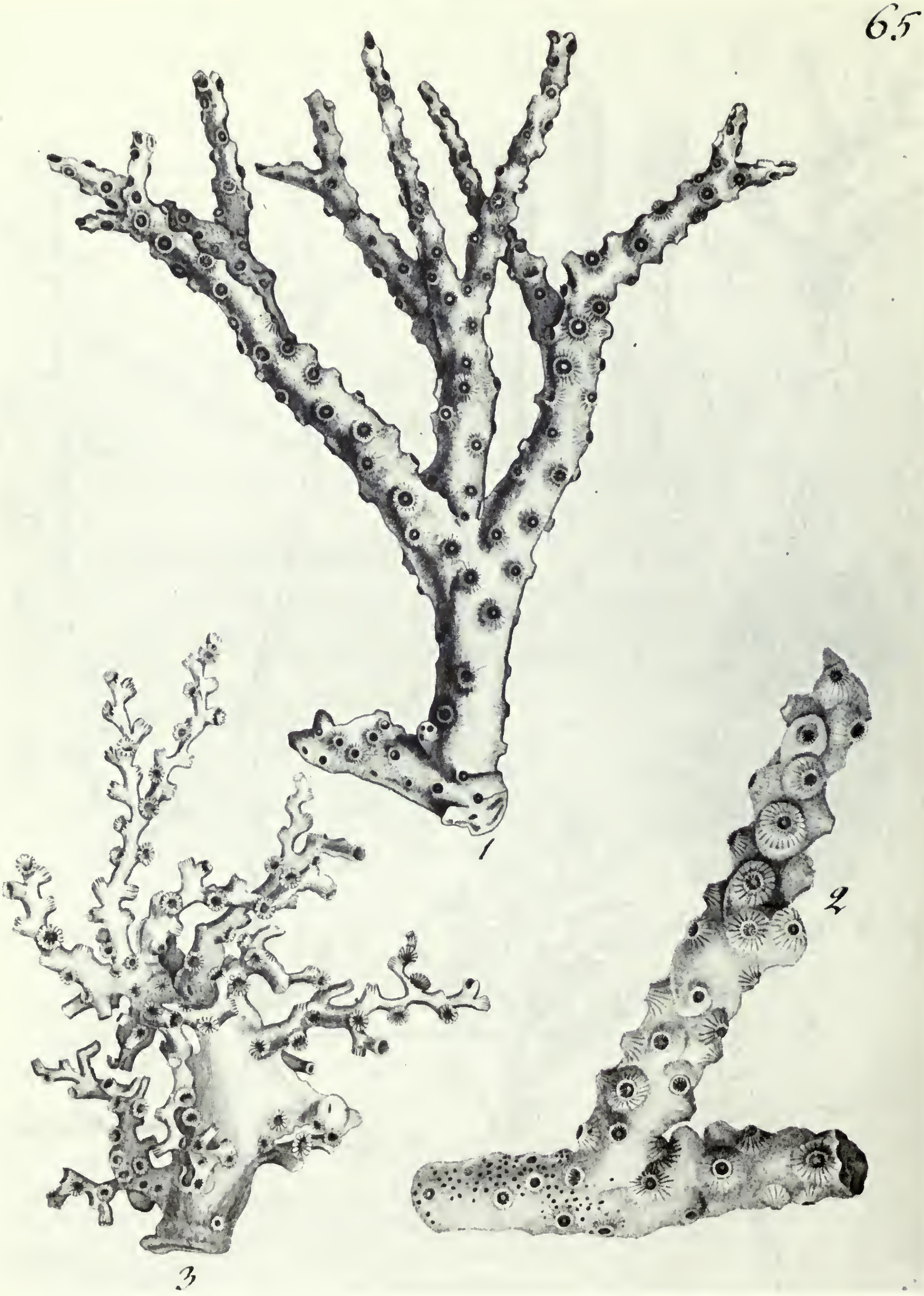
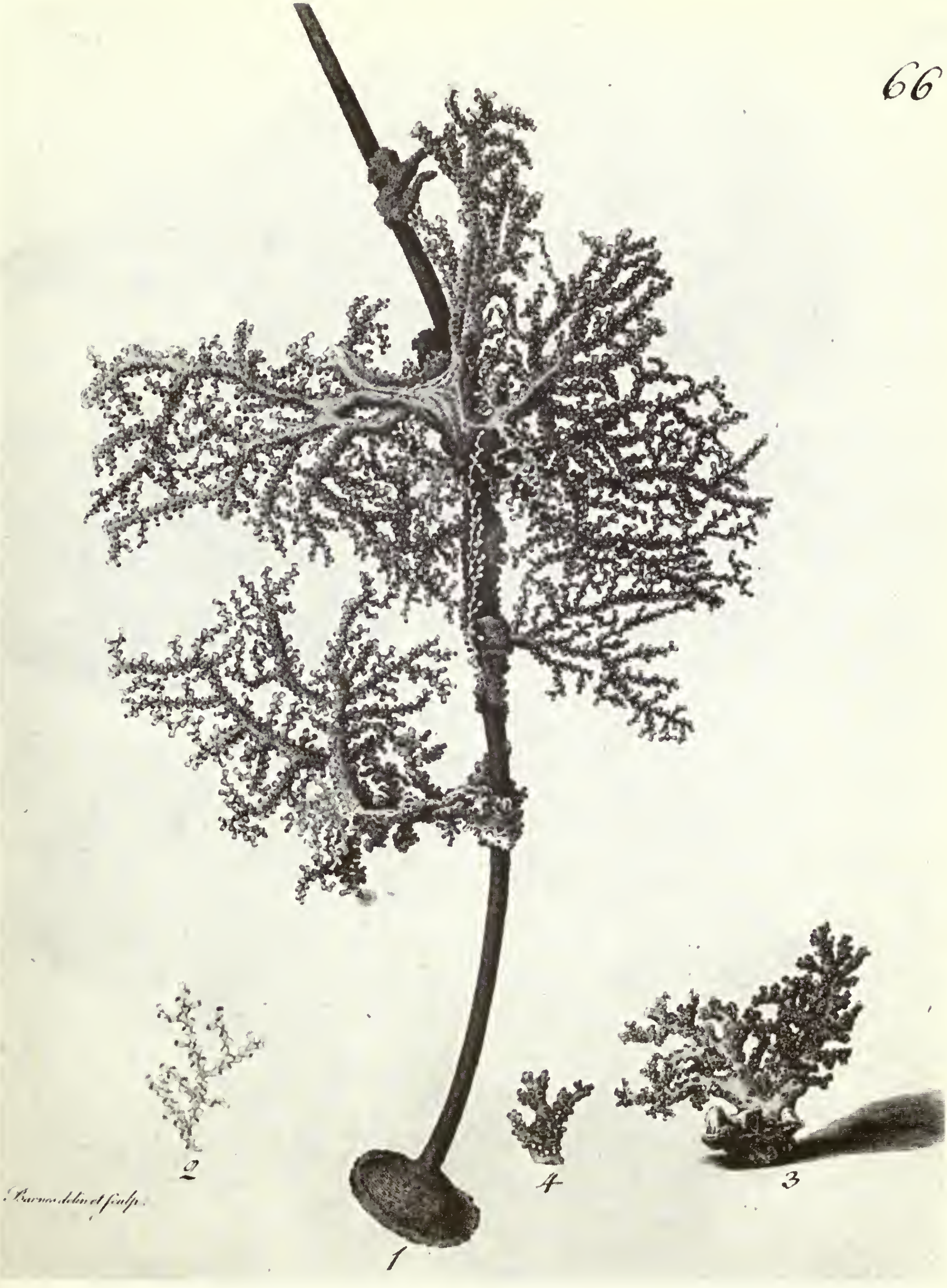


Fig. 3 The unpublished plate 65 from Ellis & Solander (1786). For identification of the species see Figure 8 and the text (pp. 30–31, 66).


66
1
2
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4
Barnes delin et Sculp.

Fig. 4 The unpublished plate 66 from Ellis & Solander (1786). The wording at lower left reads 'Barnes delin et Sculp.'. For identification of the species see Figure 8 and the text (pp. 31–32, 66).

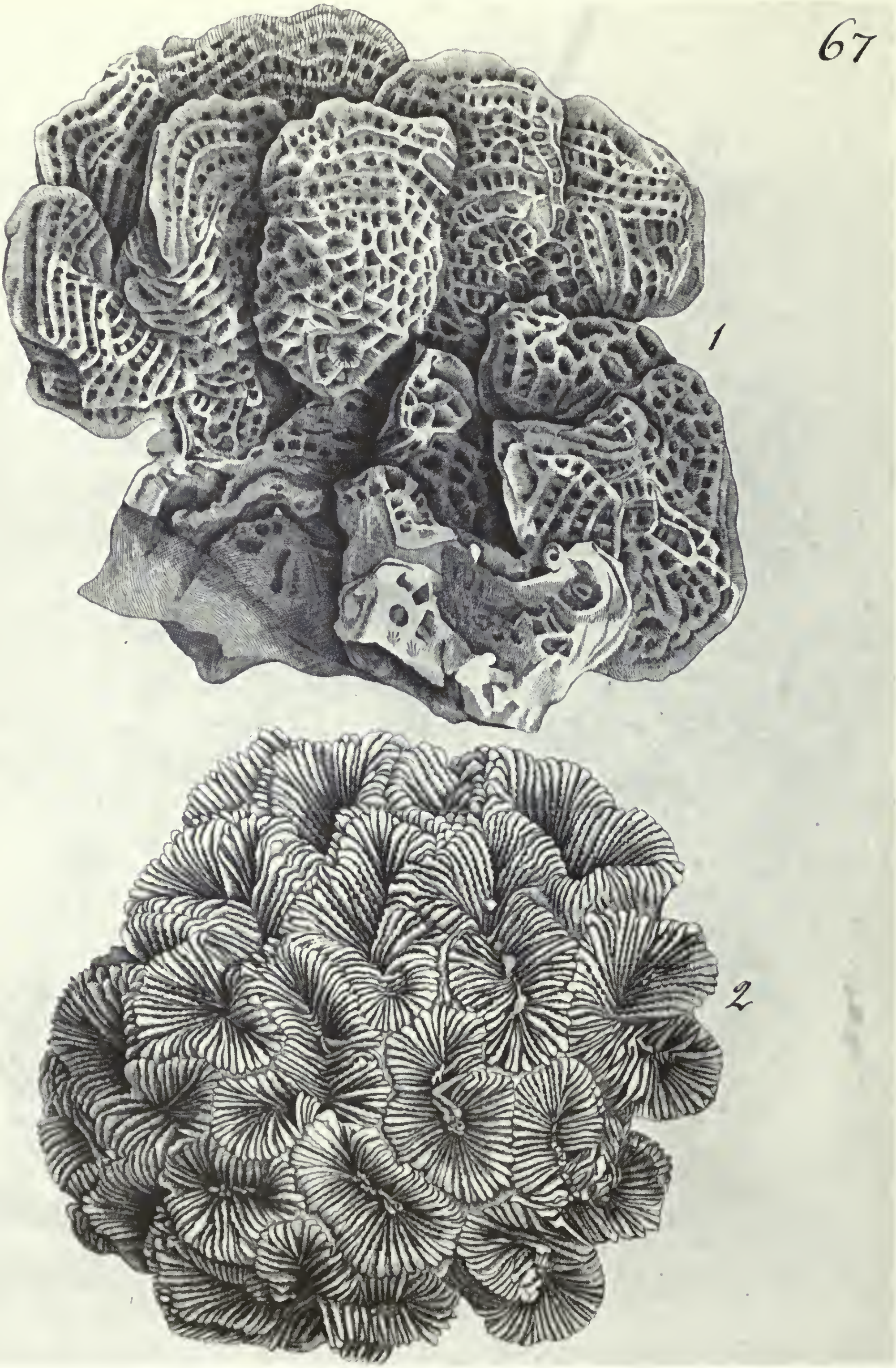


Fig. 5 The unpublished plate 67 from Ellis & Solander (1786). For identification of the species see Figure 8 and the text (pp. 32, 66).

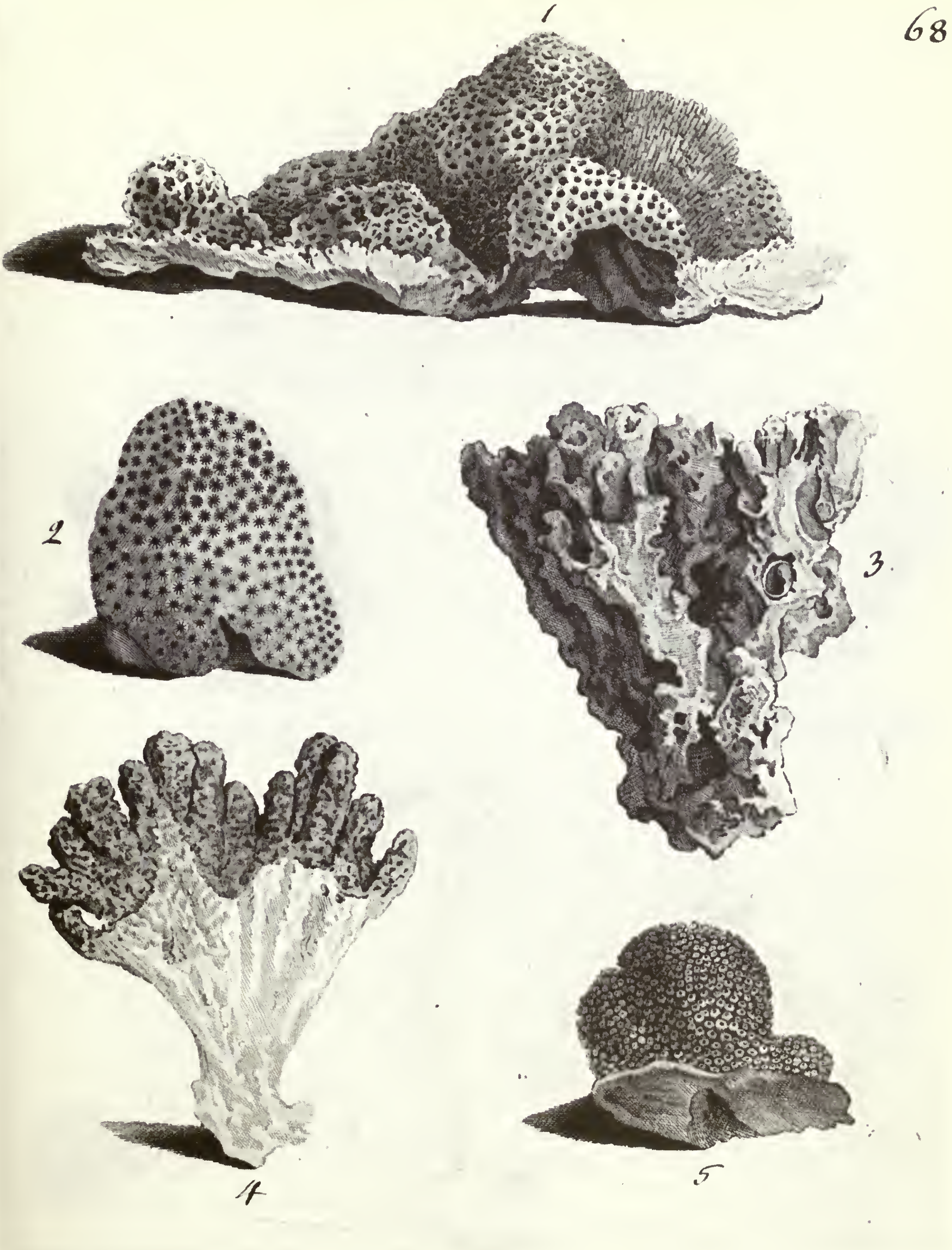


Fig. 6 The unpublished plate 68 from Ellis & Solander (1786). For identification of the species see Figure 8 and the text (pp. 33–34, 66).

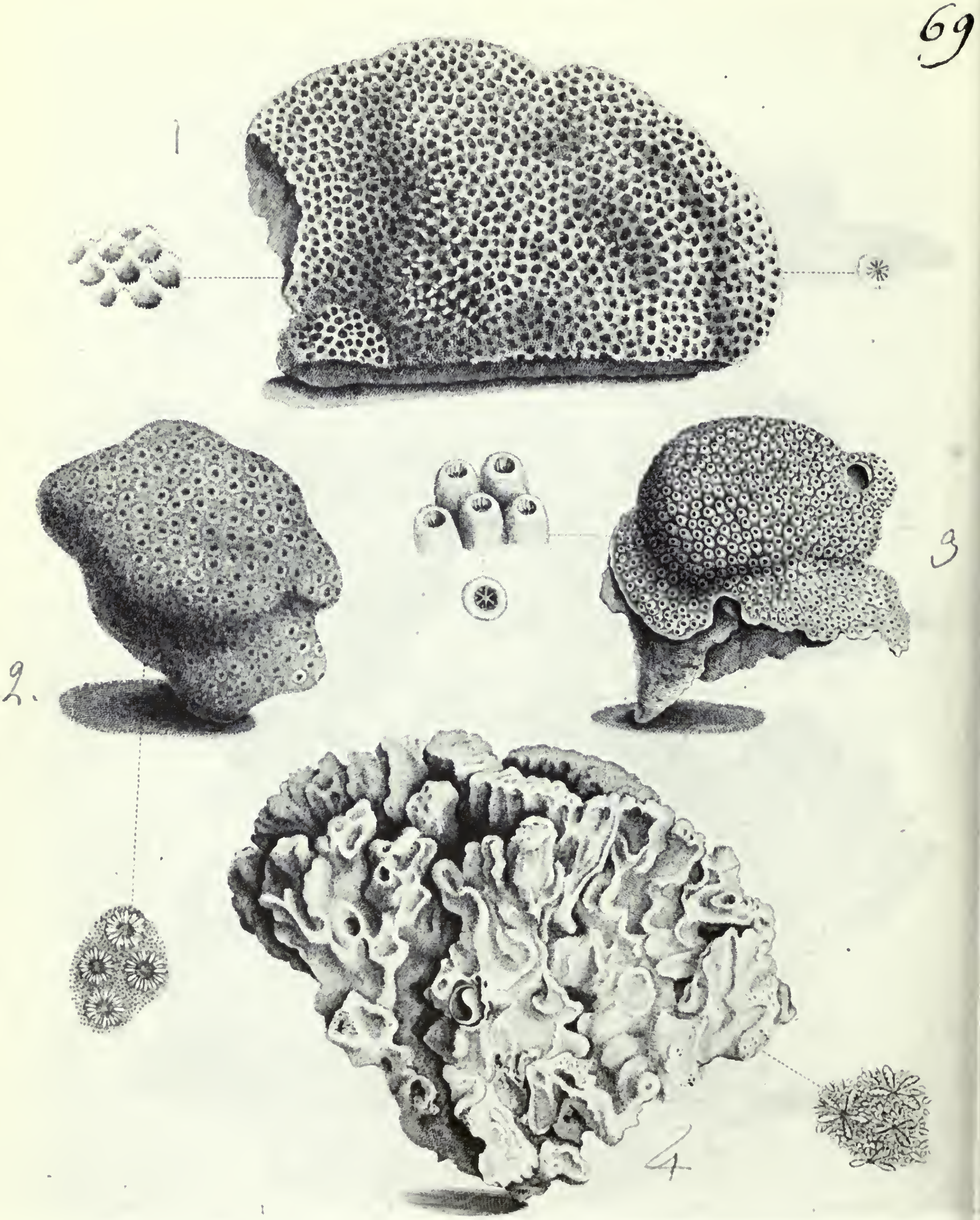
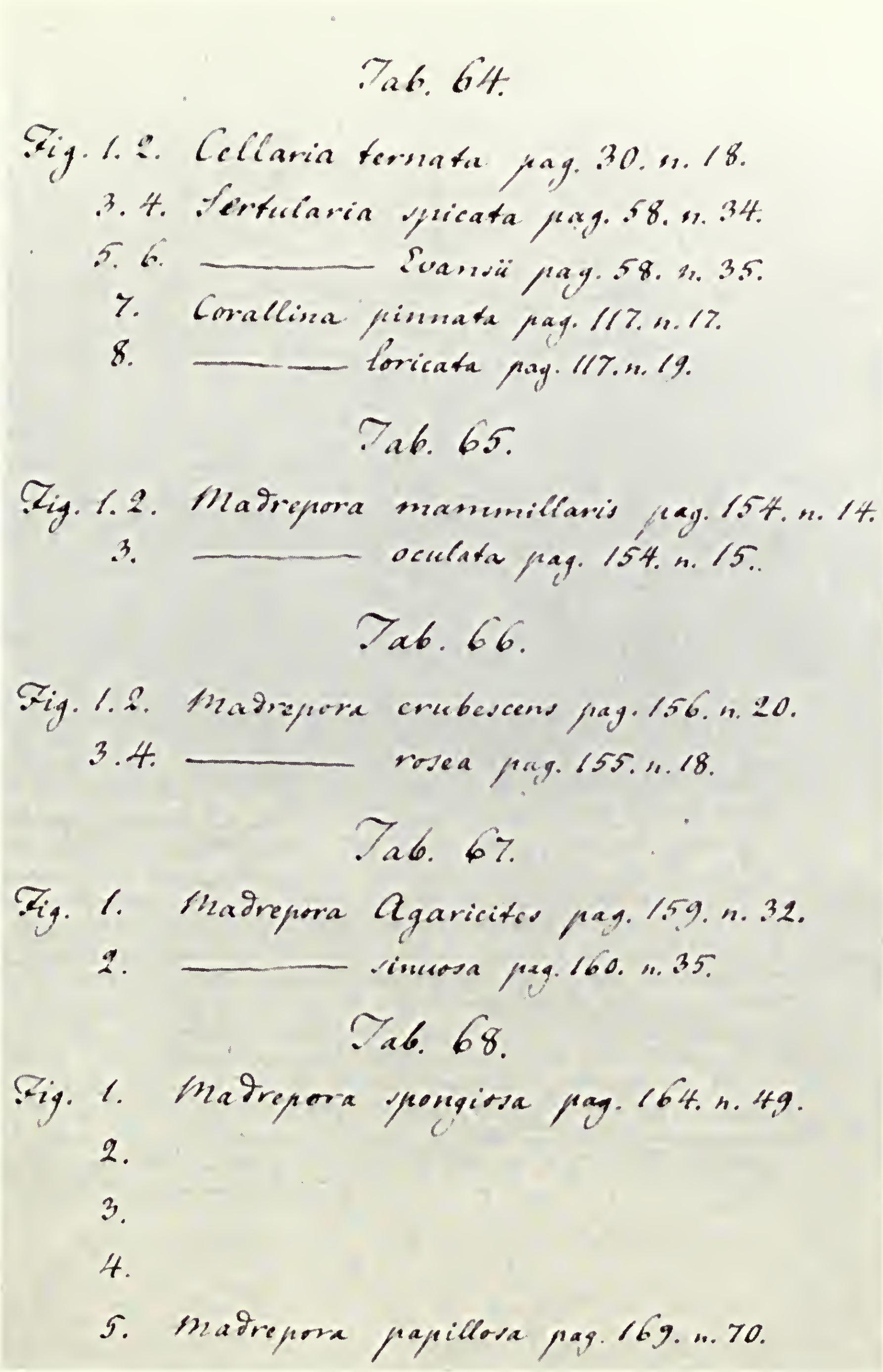


Fig. 7 The unpublished plate 69 from Ellis & Solander (1786). For identification of the species see Figure 8 and the text (pp. 35–36, 66).



Tab. 64.

Fig. 1. 2. Cellaria ternata pag. 30. n. 18.
3. 4. Sertularia spicata pag. 58. n. 34.
5. 6. ——— Evansii pag. 58. n. 35.
7. Corallina pinnata pag. 117. n. 17.
8. ——— loricata pag. 117. n. 19.

Tab. 65.

Fig. 1. 2. Madrepora mammillaris pag. 154. n. 14.
3. ——— oculata pag. 154. n. 15.

Tab. 66.

Fig. 1. 2. Madrepora erubescens pag. 156. n. 20.
3. 4. ——— rosea pag. 155. n. 18.

Tab. 67.

Fig. 1. Madrepora Agaricites pag. 159. n. 32.
2. ——— sinuosa pag. 160. n. 35.

Tab. 68.

Fig. 1. Madrepora spongiosa pag. 164. n. 49.
2.
3.
4.
5. Madrepora papillosa pag. 169. n. 70.

Fig. 8 Manuscript captions to the six previously unpublished plates, written by Jonas Dryander, Sir Joseph Banks's librarian. See text (pp. 24, 66).

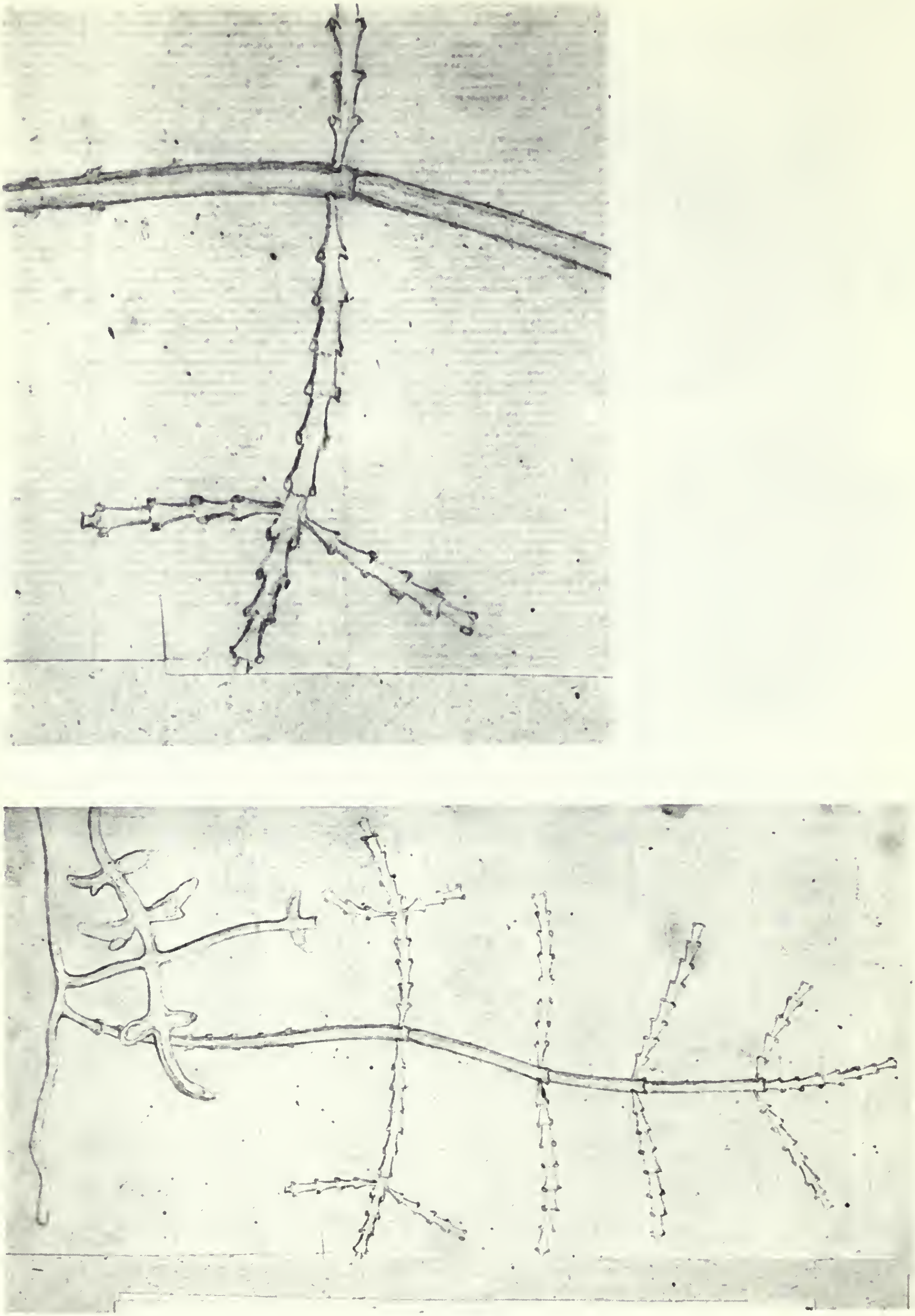


Fig. 9 Original pencil drawings, either by John Ellis or commissioned by him, for the figures of *Synthecium evansi* appearing in the present Figure 2. The top figure shows a detail from the bottom figure. See text (pp. 64–65) for further details.

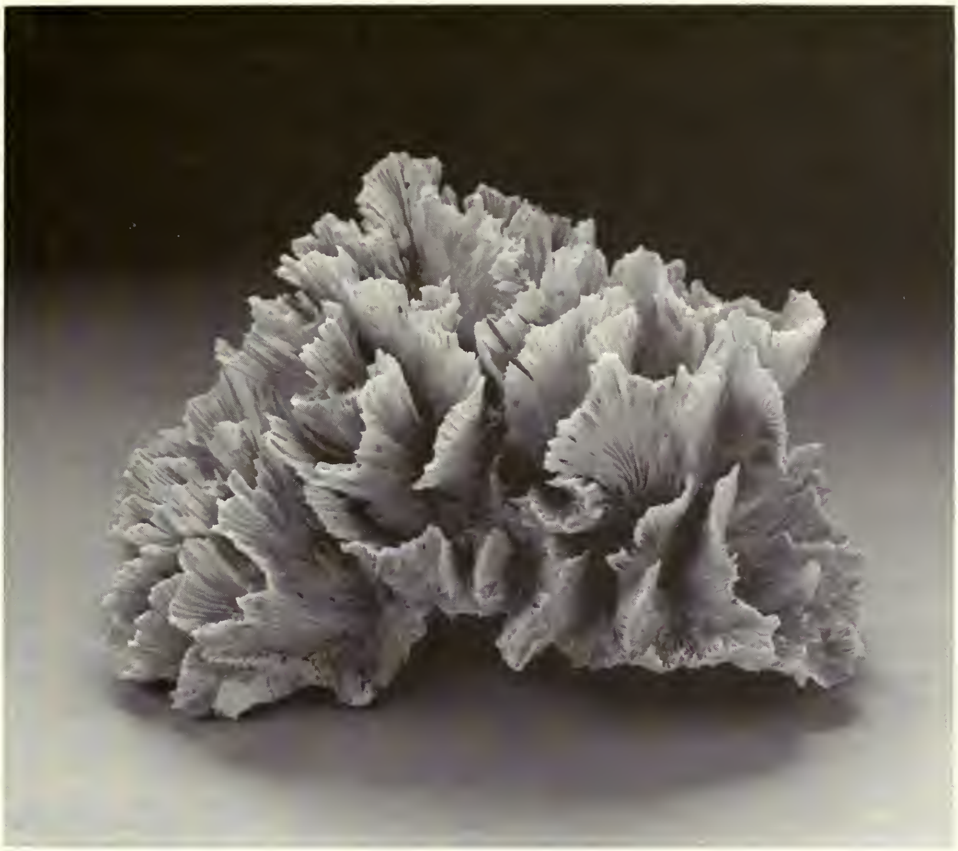


Fig. 10 *Pectinia lactuca* (Pallas, 1766, as *Madrepora*) (BMNH regd. no. 1987.6.1.1). The specimen was illustrated by Ellis & Solander (1786, pl. 44) whose published engraving, like the present photograph, was reversed. Comparison shows many similarities, and gives an idea of the level of precision accomplished. The specimen was stated by Ellis & Solander to be in the BM collection, one of the few so indicated (p. 55). Apparently few corals were in the BM collections at the time and the specimen might have come from Sir Hans Sloane's collection. Circumstantial evidence suggests that it was probably not an *Endeavour* specimen. Only one other Ellis & Solander specimen, a sponge, is known to be in the BMNH today (p. 55; Bergquist, in press). The original drawing for the engraving of the present specimen, one of the finest in the book, is also still preserved (p. 52). The species was based on Seba's *Permagna & valde elegans conche fungiformis* . . . (Seba, 1758, vol. 3, p. 180, pl. 89, the two figures numbered 10). The Ellis & Solander illustration was the first following Pallas' redescription and introduction of the specific name. Since the holotype is lost the present specimen would be available to be made neotype, but this is not proposed here. The specimen is also illustrated in Anon. (5) (1987), in colour.

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Charles Darwin's Notebooks, 1836–1844

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Darwin's notebooks provide an invaluable record of his scientific thinking and, most importantly, the development of his theory of natural selection. This edition of the notebooks, prepared to the highest modern standards or textual editing, thus affords a unified view of Darwin's professional interests.

The *Red Notebook*, used on the voyage of H.M.S. *Beagle* and afterwards in England, contains Darwin's first evolutionary statements. In July of 1837, Darwin began his 'Transmutation Notebooks' (B–E) devoted to the solution ofthe species problem, and in the third notebook of this series he first formulated the theory of natural selection. To this can now be added another species notebook reconstructed from loose sheets; this 'Torn-Apart Notebook' represents the fifth Transmutation Notebook.

This volume also contains Notebook A on geology, Notebooks M and N on man and behaviour, and other notebook and manuscript materials from the period 1836–1844.

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Goody two-shoes or a monument to industry? Aspects of the *Phycologia Britannica* of William Henry Harvey (1811 to 1866)

James H. Price

Historical series Vol 16 No 2 15 December 1988

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Goody two-shoes or a monument to industry? Aspects of the *Phycologia Britannica* of William Henry Harvey (1811 to 1866)

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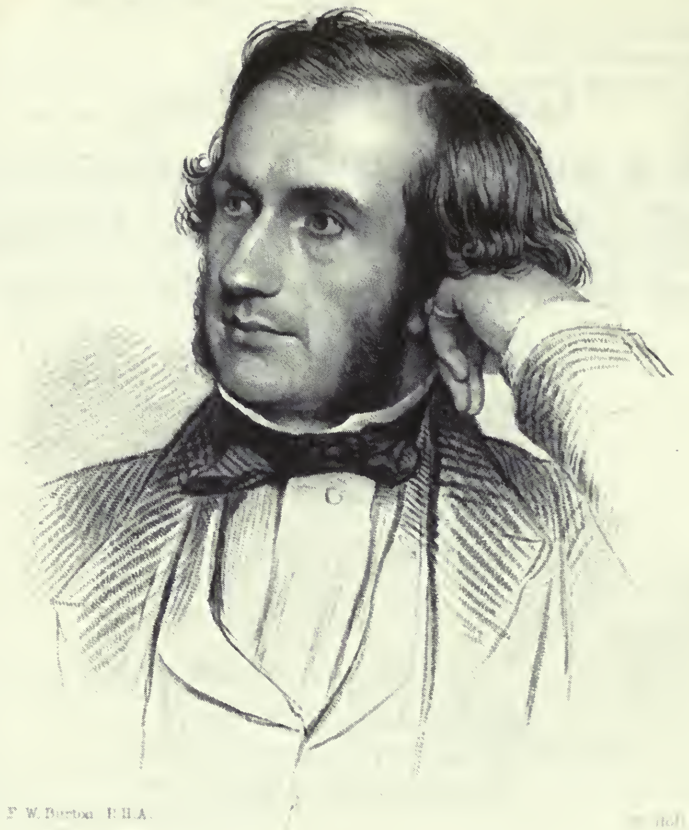

Yours very truly
W. H. Harvey.

Plate 1 The younger Harvey (aet. 40). Portrait, intended for publication in association with the 'second edition' (1849) of the 'Manual', but delayed due to Harvey's absence in USA and finally issued (1851) against the signed return of the Publisher's notice (dated 20/12/49), inserted in the 'Manual' as released.

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Mrs J. A. Moore, British Museum (Natural History), who spent much time scanning *The Athenaeum* on my behalf;
H. K. Swann of Wheldon & Wesley Ltd., who kindly at one time lent (a) copies of the original issues of parts of the *Phycologia Britannica* with wrappers still intact; (b) a copy of Vol. II of the primary systematic arrangement (1846–1851); (c) a copy for comparison purposes of the so-called 'New Edition', Vol II, of 1871;
W. F. Farnham, Portsmouth Polytechnic Marine Laboratory, who kindly made available his then recently-acquired collection of remaindered text-pages, cut and uncut, of both original printings and later re-printings of *Phycologia Britannica*;
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Ms Leonora Thompson, the present member of the Library staff in charge of the Archives Room, Royal Botanic Gardens, Kew, for very considerable on-going aid on similar topics.

The considerable help provided by many members of my own parent institution, British Museum (Natural History), particularly staff of the Library Services and of my own Section of the Department of Botany, has been invaluable. I am especially appreciative of the aid given by the editorial group of the Historical Series in which this paper appears.

Notes on Manuscript Sources

Throughout the text, sources of particular quotations are cited in conjunction with the quotation itself. The locations of particular correspondence collections involved in the letters quoted are as follows:

1. The correspondence, incoming and outgoing, of W. J. Hooker, is principally housed in the Archives Room, Library of the Royal Botanic Gardens, Kew.
2. The correspondence, incoming and outgoing, of J. D. Hooker is similarly housed as that of his father, in the Archives Room, Kew.
3. The M. J. Berkeley Correspondence Collection is housed in the library of the Department of Botany, British Museum (Natural History), London, SW7 5BD.
4. The C. E. Broome Correspondence Collection is housed in the library of the Department of Botany, British Museum (Natural History), London, SW7 5BD.
5. The Lovell Reeve Archive Collection, which includes the Letter Book (Drafts) for 1847–1872, to which much reference is made, is held in the Archives Room, Library of the Royal Botanic Gardens, Kew.

I. Introduction

William Henry Harvey (Plates 1 & 2) was one of the major figures in British, and indeed world-wide, phycology in the middle years of the nineteenth century. General assessments of the significance of the man and his work have been produced at intervals over recent years, perhaps the best known and most useful being those by Praeger (1913), Papenfuss (1976) and Webb (1966). Whatever is thought of Harvey's standing as an original scientific mind, all authorities have agreed without reservation as to his industry and application. There can have been few workers, even in those eras of passionate belief in one's own activities, that manifest greater self-sacrifice (not so regarded by them!) and commitment than Harvey. Snippets throughout his correspondence with colleagues and friends continually attest to this, in terms of both frustration when obstacles completely prevented desired activity patterns, and explanations of life-style when such obstacles were not insurmountable. An example of the latter in circumstances wherein commitments exceeded available time occurs in his letter of 22 April 1846, to Joseph Hooker, in the earlier phases of production of *Phycologia Britannica*: 'I was up & down at ¼ past 5 this morning, and killed 3 Polysiphoniae before breakfast.'!

The main title of this paper may demand some explanation, particularly for non-British readers or for those not quite as aged as the present author. It is, in fact, virtually a quotation from Harvey himself and the full context can be read on reference to Harvey's letter (pp. 121–22) of 'Easter Evening' of 1846 to Joseph Hooker:

> It pains me to look at the $4^{\text{th}\cdot}$ number, which is turned out more like a child's 6^{d} toy book—Goody two shoes or the like—than like an "opus magnum" as it ought to be.

The style of paragraph 1 of that letter is completely consonant with Harvey's quirky sense of humour and the titular use of his words is therefore wholly appropriate. I will leave the reader of this paper to decide in which of the categories he believes Harvey's work to lie; my own opinion will become abundantly clear from the text that follows.

Even before the involvement with *Phycologia Britannica*, Harvey had fairly similar tendencies to over-full patterns of work. He wrote on 17 June 1844 (to an unstated recipient; Fisher, 1869: 147):

> I am as busy as a bee these times, and now steal an hour of the night to write this hurried note. I rise at five A.M., or before it, and work till breakfast-time (half-past eight) at the 'Antarctic Algae.' Directly after breakfast I start for the College, and do not leave it till five o'clock in the evening. Again at plants till dusk. I am writing on the 'Antarctic Algae,' and arranging the Herbarium, and have been working at Coulter's Mexican and Californian plants. I have free range of the Library, to go there and poke into any hole and corner I like.

The *Phycologia Britannica* was completed well over a hundred and thirty years ago; it remains, albeit dated, a standard work of reference on the marine algae of the British Isles. Some of the plates are still unsurpassed as coloured illustrations of detailed gross morphology, although the overall final production was somewhat variable. These plates were lithographic, prepared initially by Harvey. Webb (1966: 40) considered them to 'exhibit no great artistic sensitivity' [hardly important, since that was not their purpose], but added 'they are cleanly and accurately executed, and they show, besides the general form, as much of the detailed anatomy as could be ascertained by the rather primitive microscopes of his day'. Fifty years and more after their publication, the plates were still causing comment such as '. . . c'est l'ouvrage le plus important, pour les figures des Algues, de notre région' (van Heurck, 1908).

Even Webb (1966: 40) indicated of the *Phycologia* that 'although the lapse of 120 years has rendered it very seriously out of date, [it] is still the best book for a student learning to name his seaweeds, and is sought on the second-hand market not, like most illustrated works of its period, as a connoisseur's piece, but as a working manual'. With the phenomenal increases in costs of second-hand books over the years since Webb's statement, it has become virtually

Yours ever affy
W. H. Harvey

Plate 2 Harvey, the advancing years. Portrait published in [Fisher], 1869.

impossible for the individual newly to acquire a copy of the book purely for working purposes, although it is still sought by well-funded libraries and by individuals seeking secure investment.

Since the *Phycologia Britannica* remains to this day such an interesting and important work, it is surprising that, apart from imprecise details of publication dates previously reported (Setchell & Gardner, 1920: 313), no more comprehensive bibliographic and historical treatment has been attempted until very recently (Price, 1984). Even there and in the present study, some facets of the original production are hardly touched on. One of these is the length of the print-run in connection with all the versions, plates and text. My information is still so very incomplete in that matter that I have not thought it worth including at all for now. When and if more definitive data can be established, I will publish further as a supplementary treatment.

The publication dates (Price, 1984) of the individual numbers of this part-work are sometimes especially important since, as the work was produced over such a long period and in parallel with other texts, it is not always clear which of Harvey's various publications first carried data, nor whether he or other authors were the first to notice matters in print. A considerable step toward accurate comparative dating was provided in Price (1984); the latter paper and the present text together deal with most major aspects, historical and bibliographic, of Harvey's principal work on British benthic marine macroalgae.

Harvey himself, in the 'Advertisement' dated 3 December 1845, explained something of the circumstances leading to the publication of *Phycologia Britannica*, and of the rationale behind its mode of publication; the 'Advertisement' was published with volume I of the work, as issued both when completed and when the whole work was finished in 1851, and can be confirmed as having been distributed with the first part of the work, as originally issued separately. This confirmation derives from a copy of Part 1, still in its original wrappers and kindly brought to my notice initially by Mr H. K. Swann of Wheldon & Wesley Ltd. In essence, Harvey indicated that primarily he wished to accompany the descriptions given in his *Manual of British Algae* (1841) with illustrative plates. However, since the latter work was published on the eve of his last voyage to the Cape of Good Hope (a mistake on Harvey's part—it was actually published *during* his third period, (27 July–) 5 October 1840 to ?end 1841 (–*c.* 17 February 1842) in Capetown), when he had been but a short time in Europe, that had not proved possible and he had so stated in the text of the *Manual.* After his return from the Cape, he was frequently asked to implement his partial promise to provide illustrations, either through an enlarged (new) *Manual*, or through an entirely new, larger work. He (at that time) preferred the latter course and subsequently decided to add, to the last volume, a general 'Introduction to Marine Botany' and a 'Systematic Synopsis'. In the event, both a revised *Manual* (1849)* and the entirely new larger work (*Phycologia*) were in due course produced.

One plausible explanation has been advanced to account for Harvey's expressed (1845) preference for an entirely new work. Mrs [M.] Gatty (in Fisher, 1869: 221) stated that:

> He [Harvey] revised and corrected all the proofs of the 'British Seaweeds' [by Mrs Gatty and based essentially on *Phycologia Britannica*] many years afterwards. And this in spite of his almost morbid dislike to going over old ground a second time. But for which feeling, indeed, we might have had a revised edition of his 'Manual',† a boon to the public which it was almost cruel on his part to withhold.

Harvey had reasoned that it was possible to restrict the projected illustrative work to macroscopic benthic marine algae, since Hassall's *A History of the British Freshwater Algae*, then recently (20 September 1845) published, and work by John Ralfs, than in progress, eliminated the need for treatment of the fresh-water algae, desmids and diatoms.

From other statements, Harvey seems to have had two possible plans in mind for the arrangement of the work. He initially considered a systematic order from lowest to highest forms, or vice versa, as the most obvious way to go about things if the work were to be issued as a whole from the Press. However, since this project, in common with many other comprehensive eighteenth and nineteenth century works, gelled as an extensive treatment in parts (to be issued in this case over five years), the objection to the systematic order was largely that it would prevent the introduction or early publication of new species. The second plan, and the one finally adopted for the primary version of *Phycologia Britannica*, was that a selection of species, from several different genera taken from as many families so that there should always be a variety of subjects in each monthly number, should be illustrated together. This plan was modified by the reservation that, as early as possible in the work, at least one species from every genus should be figured; the aim was to place 'before the student' illustrations of all the genera by the end of the twentieth number, projected to complete the first volume of the collated parts. In the interim, the general arrangement of the *Manual* (1841) was intended to serve as a synopsis of the main contents of *Phycologia Britannica.* In talking here thus of systematics, incidentally, it is worth mentioning that for ease of reference, and because in general little or no equivocation is thus involved, the nomenclature employed by Harvey as to species names has been maintained throughout the present study.

Harvey recognized at this stage that the principal objection to the proposed system was that purchasers wishing to have copies bound in systematic order would have to defer the binding of the work until publication was complete. These direct statements, and the additional requests for specimens of rarer British algae to be sent to him by people from all parts of the coast to complete the work, show clearly that Harvey's inclination (and in the end his contractual commitment) was always to produce such a text in parts over a long period.

---

*The 1841 *Manual* was finally revised and up-dated (1849) during the run of *Phycologia Britannica*, then being illustrated with similar but smaller figures.

† Presumably Mrs Gatty was here referring to a possible further revision of the 1849 work.

II. Content and Arrangement

A continuous textual treatment of the content and arrangement of this most complex work would have been turgid to construct, to read, and to handle as a data source. Accordingly, the synoptic treatment (Table I) has been adopted and presented here as much the more useful from all points of view. Read in conjunction with the table of part-dating presented in Price (1984), it provides ready access to all major comparative and identificatory characteristics of parts and constituent plates normally required. Without total sight of all copies of the work, in whatever form, still extant and accessible, this table can hardly be claimed as absolutely comprehensive; such would be an impossible task. I believe, however, that the presentation is sufficiently complete to provide answers to all those questions commonly requiring to be posed about the work and, in so far as correspondence and similar sources reveal them, the detailed text adds the perspectives on the states of mind of, and particular significance of additional remarks made by, its author. In this context, bear in mind the greater sophistication of approach, and vastly greater wealth of data on particular taxa, achieved by the end of the work in 1851 than at its beginning in 1846.

Neither this section, nor the Table (I) which forms its primary basis, seeks to highlight every nuance of slight variation between different versions of content—that would be neither possible nor desirable. The Table aims to establish, so far as they can be deduced, general characteristics of variation across different forms of the text. Colour variations in printing between copies or printings of the plates are occasionally mentioned (but more detailedly and specifically in Appendix IV) where they appear of critical importance; the latter is rare. Individual cases of otherwise misleading textual variation *are* examined where they seemed to the present author to be of some significance; the choice may sometimes appear (and may well be!) a trifle arbitrary, reflecting often as much the availability of data as the realities of assessed critical importance. I would be grateful for data on additional cases known to others with access to critical information that has escaped me. The size of the task in attempting to be complete on a work of this complexity and range will be clear to all those who have undertaken similar work. At least sufficient information is presented here, in text or tabular data or both, to distinguish on general or specific grounds between all known versions of the text for all individual species covered by Harvey's publication.

In the Table, it will be seen that (of the text versions) 'A' always refers to that shown, known, or deduced, to be the earliest published. The basis for that knowledge or deduction derives from examination of an authentic early 3-volume version always maintained as such (now in the British Museum (Natural History)); from a large number (virtually 50% of the whole work) of parts intact in their original wrappers, or with original wrappers still enclosing a proportion of the original part content; and from contemporary or near-contemporary external sources of data, such as original correspondence, draft letters, reviews of the day, remaindered copies of text versions for the species, and so on. Details of sources are given in the text or in notes, where it seemed possible that others may wish to pursue matters further; I will be happy to supply details on any sources not identifiable from the present text.

The relationships between versions A, B, and C are therefore generally as follows. Version A is the earliest; from the remaindered text copies in my possession, it is generally easy to identify A from the overall appearance of the sheets, aside from the printed text on it. More specific differences are only very rarely absent from the original (A) cf. later (B, C) versions. Such differences are given in the last column to the right in Table I. B and C versions are more closely related than is either to A. Indeed, C is usually a straight reprint of B, prepared on smoother finish paper for market demand satisfaction at later dates. Where 'state 1', 'state 2', or similar phraseology is employed, it signifies that reprinting was carried out for some more fundamental content-change purposes than simple market demand; examples are plates 15 and 48 (see the Table and Appendix IV for detailed treatment). Neither of plates 15 or 48 was reprinted from State 1, presumably since the changes relevant occurred early enough in the currency of the work for there to have been no excessive demand at that point for the part concerned. State 2 *was* reprinted for both these plates, and therefore occurs in versions A and B.

Three major general characteristics of textual layout identify the basic differences between versions of the texts (see also Plates 11 & 12). These are:

1. The size and layout of Greek lettering used in cases where the etymological derivation of generic name is so explained as to require that lettering. Version A, the primary, is *always* printed in smaller script than all states of the subsequent printings, so far as can be traced. Italic script also used sometimes (but not always) shows differences of size and layout between versions—generally version A script is smaller and more tightly arranged than that of subsequent versions.
2. Division lines between sections of the presented text, particularly that wavy line which divides species descriptive data (the third section of each entry) from the general commentary (always that printed in the largest type-face used and the fourth section of each entry). Version A almost always differs from states of version B in the positions of line starts and finishes, and of spacing, relative to adjacent lines of the text.
3. The presence and positions of basal signatures utilized by printer and binder in arranging and making up. Signatures present on version A always at least change size, form, relative spacings, and/or overall positions on subsequent versions or states; quite often, the signature is wholly omitted from versions subsequent to the primary version A.

There are also good, but other than individually inconsistent, differences that are useful for some species entries but not for others; details of these in some cases immediately identify the version which is present and are for individual entries (species) the quickest and most certain indicators. These are so characteristic when present that they are preferentially listed in the last column in Table I. Less often listed, unless they are the only differences present and of use, are other less consistent variations such as: (i) those relating to the relative cross-page (i.e., vertical alignment) positions of major headings and the text they delimit and concern; (ii) the type-face of punctuation (often semi-colon) that follows italic script, when used—this tends to vary between versions, from the correct Roman face (commonly present in version A) to the incorrect italic face (usually in version B, all states). Line content shifts, other punctuation, and the presence or absence of accents are also of distinguishing use on some occasions and are mentioned as appropriate in the summary column to the right of Table I. In these instances, except in cases susceptible to succinct statement, reference is made merely to the type of variation present, not to its detailed content. Space was not available to allow further elaboration.

III. Aspects of the Background

Events prior to the commencement of publication

What seems to have been the original urge to produce such a work as *Phycologia Britannica* has already been mentioned in the Introduction, i.e., Harvey's feeling of the need to accompany the descriptions given in his *Manual of British Algae* (1841) with illustrative plates; in the event, this turned into a new work rather than an extension of the *Manual*. Although it is difficult at this distance in time to be sure, and indeed Harvey himself may not have been completely aware of the reality behind it, the human mind being what it is, all this may contain a large element of rationalization after the event. The reasons for so stating will emerge.

Harvey's lengthy and often intense correspondence with the Hookers, father (W.J.) and son (J.D.), is a rich source of information on the various aspects of the germination and progress of *Phycologia Britannica*; that correspondence is principally now held in the Archives Room, Royal Botanic Gardens, Kew. Harvey confided in and sought advice and help from both W. J. and J. D. Hooker to a degree much greater than appears to have been the case from letters exchanged with any other correspondents. The extent of Harvey's correspondence with the Hookers can be judged from his own nicely-phrased comment on the matter (Letters to J. D. Hooker, vol. **11**, f. 19) that 'My letters follow something like incidents in the life of Solomon Grundy'!

Nevertheless, Harvey was almost similarly prolific a letter-writer to many of his contemporaries, and the rate of production seems to have kept both he and his intentions early, well and truly before those interested who mattered and/or were able to assist. On the illustrative project that finally emerged as *Phycologia Britannica*, for example, John Ralfs was already writing to M. J. Berkeley (from Penzance, Cornwall) on 30 December 1844 (Berkeley Correspondence, Vol. **10**, RAL-THW) that:

> I hope M$^{r.}$ Harvey, in his intended work, will include all the Algae as I may then have an opportunity of showing that I am willing to assist when treated fairly and know that my information will be properly acknowledged.

The latter aside is a reference to the heat being generated at that time between Ralfs and A. H. Hassall regarding Desmidiaceae data for the latter's book, then in progress.

It is probable that the form of *Phycologia Britannica* that finally emerged was very much coloured, through the medium of the close correspondence and friendship with the Hookers, as well as the eventual involvement of Lovell Reeve, by the style and manner in which there emerged the 'British Flora' plates (W. J. Hooker) and the 'Antarctic Flora' that both J. D. Hooker and, to a lesser extent, Harvey himself, were already producing. Even the usual flow of correspondence with Harvey was affected by these commitments, as is made clear in a letter from W. J. Hooker to Harvey (Sir W. Hooker's Letters to Dr. W. H. Harvey, **1832–60**, f. 163) and dated 5 April [1845]:

> I trust bye & bye that Joseph & I shall be a little more at liberty than we are now. The Antarctic Flora occupies all my son's time & much of my own in addition to my ordinary labors—for there is not ǒnly the text but all the drawings & plates to prepare & they say the first N$^{\underline{o}}$ will appear on the 1$^{\underline{st}}$ June.

That the general process of idea germination stimulated interest in the growing *Phycologia* project in the publishing world is also clear.

The implication from available evidence in the Harvey–Hookers correspondence so far examined is that the materialized form of the *Phycologia Britannica* concept must have arisen as a fairly direct result of discussions that appear to have begun in or before early 1845 between Harvey and his friend, the publisher John Van Voorst. There were, as will emerge later, to be many changes before production began, and the primary origin of the idea of illustrative extension of the *Manual* is as yet not, and may never be, entirely clear. Van Voorst was the publisher of the 1841 *Manual* and a special version of this latter, prepared by Harvey for presentation to Van Voorst, is now in the possession of the Department of Botany, BMNH, whence it came from the Linnean Society of London. This version may have represented some early stage in the discussions and generation of the ideas. The illustration in the version referred to is in the form of actual pressed specimens; those would obviously have been completely impracticable in terms of an issue of at least several hundred copies, apart from that being a less effective illustrative process than the interpretative drawings finally produced by Harvey.

By 24 April 1845, Harvey's interest in the matter of illustration and the methods to be adopted had gone sufficiently far for him to be exploring with W. J. Hooker and J. D. Hooker, amongst others, the feasibility of several different alternatives. In a letter of that date (W. J. Hooker, English Letters, vol. **23**, f. 276), Harvey wrote to W.J.H. from Trinity College, Dublin, on the subject of 'transfer paper work', of which he had then produced his first attempts, one subsequently coloured, the other left plain. Although Harvey himself was not unduly impressed by his first attempts, he was clearly not disheartened: 'Though it is coarsely done I do not feel discouraged, for I feel certain I should succeed better after a few trials—but it is more difficult than I anticipated.' It is similarly clear from the rest of this same letter that the illustrative project had already aroused in Harvey, and for that matter also presumably in Van Voorst, a serious level of commitment. For its demonstration of the extent to which Harvey was indebted to the Hookers for advice actively sought by him, the letter is worth further quotation at length:

> I was obliged to draw entirely with a brush not being able to master drawing with the steel pen. Of course I do not mean to attempt printing *names* myself. Brush drawing I am not at all used to, and find it slow work, & very far from *sure*.
>
> Could Mr. Fitch be so kind as to select for me a few brushes such as he uses for his fine lines—and would you have the kindness to send them to me by post?—with any remarks & hints that might be useful to a learner, and which can be so conveyed. Delicacy of touch must, I know, be born on the premises if it ever arrive.
>
> When you write please to give me the *statistics* of printing & paper of your British Flora plates, for my guidance in dealing with our printer here. I think *4* plates are transferred & printed together. The work I have in hand is to prepare illustrations of the genera of my Algae, like those in Greville—or like those in the last edition of Brit. Flora—& just the size of the latter. What I wish to know then is the cost of printing these, & the *cost for paper which will bear colouring* p 100 copies. I suppose Van Hoorst will print 500 copies—but I do not know.
>
> Excuse these troublesome queries . . . Would it be easier to draw fine lines on the stone itself?

Van Voorst was at this time obviously the prime contender for publication of whatever the form of the work would turn out to be. However, at this time too, Lovell Reeve was involved in the publication of J. D. Hooker's *The botany of the Antarctic voyage of H.M. Discovery Ships* Erebus *and* Terror, referred to as the 'Antarctic Flora' in the quotation from W. J. Hooker correspondence, above. Reeve entered the *Phycologia Britannica* scene at this point for reasons that are not entirely understood but certainly included Van Voorst's trying to encourage Harvey in his early stages of drawing and illustration by sending him proofs (at Hooker's suggestion) of some of the illustrations of algae produced by Fitch and Hooker, and printed by Reeve for the 'Antarctic Flora'. It is possible that Van Voorst may also have been thinking of utilizing Reeve's undoubted expertise, as then expressed although subsequently argued about, in the production of illustrations for the project. If that were so, it was as potentially dangerous to his (Van Voorst's) own involvement in the scheme as from the spectator's viewpoint it would immediately appear and as it finally proved to be. This contact with what was germinating clearly stimulated Reeve to invoke the Hookers's influence with Harvey on his behalf, and from subsequent correspondence of the Hookers it may be that

W. J. Hooker had always in mind the potential advantage to Harvey of widening the field of play in these early stages (see later).

Be that as it may, Reeve's request for support led J. D. Hooker to write specifically on that subject to Harvey from Edinburgh, where he (JDH) was lecturing at the University for a period, on 6 May 1845 (Letters from J. D. Hooker, vol. **5**, GRA–HAR, ff. 218–220). As a continuation of the letter in which he had already been telling Harvey about his experiences with the initial stages of lecturing, J. D. Hooker wrote:

> I began the above [the rest of the letter] in King Street & on coming here [Abercrombie Place, Edinburgh] found a letter from Reeves [*sic*] begging a testimonial about printing in colour. The last that he printed are admirably done. These are, Polysiphoniae, Ptilota formosissima Callithamnions & also the Delesseriae of Part IX are very good: nor has he actually spoiled any in the attempt but Pol. botryocarpa the first attempt that was. It was his colorist that spoiled the 4 plates of this last number though Reeves himself evidently got so impatient that he wished to lay the blame on my having them printed in colour & wrote me word that he had spoiled them. I have told him to send you the last 4 that were done; they are really superb & have cost him great trouble & expense. I believe that he had a bad colorist & as he would never take my advice about changing he did not mention him to me in the letter in which he acquainted me about the 4 being spoiled. The colorist spoiled them for they were originally beautiful—As far as the printing in colour is concerned Reeves has beat any book that I ever saw as you will see when he sends you the proofs. I sent him a furious blow up about the colorist & the way he wrote to me on the occasion which brought Reeves to his senses I am glad to say: for he is a good man though a fool. After all it must be confessed that in my book he has a most laborious task & with the seaweeds the trouble has been dreadful to all parties. His fool of a colorist, after he found that the color on the stem would not take water color, grossly carelessly *as he laid it on*, still continued to color up the whole plates: Reeves got angry at this & wrote me as if my having ordered the things to be printed in color (which he did remarkably well) was the cause of it all. The stones were not spoiled, the original lithographs are as good as ever, & if he only takes off as good impressions as the first were & ordinary lithographing he does well, then the Part X will be unique as an illustrated work on seaweeds—Anyone else could print common lithographs as well as Reeves for aught that I know but I should think no one so well in color. You must however judge for yourself by what he sends: I have seen all the 150 plates of those he sent & they are all equally good: all equally ruined by his colorist—I am of course *hard* upon Reeves—80 plates in a year is a prodigious number & I should not like him to lose your job through me: I can truly say that except for Pol. botryocarpa & Halymenia latissima the printing of all the *lithographs* whether in color or black is excellent. That he can print from transfer paper also more beautifully than anyone else the present *which please* return will show: that he has failed in similar ones my book proves. As far as going to expense & trouble is concerned no one deserves the job better than Reeves: he printed Pol. botryocarpa in 7. colors, before he would tint for tone & that did not do for coloring or working off.

Although neither the actual letter text nor the usually preserved draft text have thus far been traced of W. J. Hooker's reply to Harvey's letter to him of 24 April 1845 (see above), there clearly was such a reply and that a detailed one. Its content caused Harvey to write again to WJH, on 7 May 1845, after interim correspondence with Van Voorst; the nature of the latter missives will be evident from details of Harvey's letter (W. J. Hooker, English Letters, vol. **23**, f. 277, 1845):

> My dear Friend
>
> On receipt of your *Lithographic* letter a few days ago, I forwarded it & the specimen plates to Van Voorst, telling him candidly how discouraged I felt, & the little probability there was of my succeeding.
>
> I have this morning his answer, by which you will see (for I send you a copy* of all the important part) how seriously *he* is bent on the work, & that he offers me £225 (!!!) for my trouble, should I only succeed in drawing on the stones—that is at the rate of 12/6d for every drawing. This seems to me a very liberal remuneration for a "poor botanist", & I own strongly incites me to persevere & try & conquer the difficulty of drawing on the stone. I give up the transfer paper, as neither he nor you approve of it.—
>
> Van Voorst sends me from Reeeve [*sic*] the proof impression of *Ptilota formosissima*, which is most lovely—an admirable drawing in itself, well printed—& most correctly represents the plant. Could I compass anything half as good I should be well pleased. I perceive that the drawing is done partly in chalk, but chiefly in ink, & that none of the *lines* are of that excessive fineness that is required in a *black* drawing, but that, being in red, is not so much so.
>
> I own I still think that had I a few lessons from a competent master, I should be able to make sufficiently good drawings of the British seaweeds to meet the public. I could at least do as well as A. H. Hassall, I flatter myself, after a few trials.
>
> Now, am I making too free to crave permission to draw in Mr. Fitch's room for a fortnight ? that I might get from him some little insight into the manipulation of ink brush & stone ?—I should very willingly pay him whatever fee you think right for the twelve lessons, and thank him into the bargain—for, if I only succeed, *so as to please V. Voorst*, I hope eventually to get him to undertake a "Species Algarum" like your Sp. Fil.—

Since J. D. Hooker was away in Edinburgh and would not be an equally immediate recipient of data in Harvey's letter to W. J. Hooker (as was usually the case), Harvey wrote also on the same day (7 May 1845) to J.D.H. This letter, more chatty since to a friend from his own age-group, adds further interesting data on the situation (Letters to J. D. Hooker, vol. **11**, HAR, f. 25):

> My dear Joseph
>
> I am so "cock-a-hoop"—this morning (may your shadow never be less, I hope you are so too!) that I cannot help scribbling to tell you that the redoubtable Van Voorst has offered me £225! (in cash!!) for the copyright of "*A History of British Seaweed*". 45 N$^{\underline{os}}$ of 8 plates each = 360 plates: *provided*—& here is the rub,—I make the drawings on stone—to be printed in tints.—As I do not like to let *the trifle* of my not knowing how to draw on stone—stand in the way of so tempting an offer—& as I think I ought to be able to make at least as handsome work as A.H.H.—I have written off to Sir William to beg him to give me shelter for a fortnight, whilst receiving 12 lessons in manipulation from the Illustrious Fitch—to whom I am willing to give any fee Sir W. shall name.
>
> V. Voorst sends me proofs of your plates "Ptilota formos." & "Pol. dumosa + ceratoclada"—as examples of tint printing. As such I am charmed with them, and as drawings I admire them very much. That of the Ptilota is in all respects admirable,—omitting only that you have not shown the structure of the stem:—& the Pols. are a great advance on poor Pol. botryocarpa: The dissections good—& no cartwheels. They are two as handsome plates as need be, & I hope these representing "the officers & gentlemen" will be equally so. Comparing them with the black impressed plates in N^{o}. $\overline{\underline{\mathrm{IX}}}$. they are vastly more beautiful—

---

*This copy has similarly not, so far, been traced.

> though I suppose not so expensive to Reeves, as the former were coloured by hand. These do not require it.

This letter provides the first instance of a more or less precise statement of the overall size that Harvey must have had in mind for the proposed work, a size that was held to in the final event although detailed make up of the content in parts changed considerably—to an eventual 60 parts of 6 plates and text each, as opposed to the here suggested 45 parts of 8 plates each. It is an interesting commentary on the efficacy of Victorian mid-century postal services that J. D. Hooker had received in Edinburgh (from Dublin) this letter sufficiently expeditiously to be replying to it on 9 May 1845, in equally jocular if mathematically somewhat inaccurate terms (Letters from J. D. Hooker, vol. **5**, GRA–HAR, f. 221):

> My dear Harvey
> 999, 999 congratulations on Van Voorst's happy appreciation of your algological properties: 10,000 I reserve for myself alone, some day: When I have as much reason to be as thankful as I sometimes tried to be for [?——] in the old Erebus. I have positively nothing to say but to congratulate you. For my own part you may also extend to me a little gratulation, on my beginning to feel the truest & most heartfelt pleasure in having come here, & in having come with no selfish Bent in view: & in having overcome my modesty i.e. metamorphosed it into modest assurance. . . . I tipped you a long stave the other day about Reeves it was long enough & confusing enough but you know my *mixed* sentiments towards him, . . . If you go to Kew I would try if I were you to get as many rough sketches done under Fitches [*sic*] eye as you possibly can.

Harvey was at this stage full of organizational and executive enthusiasm. On 9 May 1845, he wrote to Rev. Miles J. Berkeley (Berkeley Correspondence, vol. **6**, GREV to HOO, from TCD):

> You will be pleased to hear that I am in treaty with Van Voorst for "A History of British Seaweeds"—to contain 360 plates, or one for each species, published in monthly parts 8 in each number, at ^{s}2/6d each. The plates to be printed in colours, & a few copies prepared at a higher price, hand coloured also. The only difficulty in the way is the yet unproved desideratum, whether I am able to make the drawings on the stone or not. I have yet to try—& mean to go to London & take a few lessons in manipulation under Fitch. I think, after a few trials, I ought to succeed as well as A.H.H. [assall] at least, & my book will be prettier than his, in as much as it will not be all green. Van Voorst has sent me some beautiful specimens of tint printing by Reeves, who is now it seems master of the art, having learned by spoiling a few of JDH's plates. One of the samples is Ptilota formosissima from the Antarctic Flora, & is in all respects lovely—a charming drawing—& most clearly & beautifully printed. The above "History" is to bring me *monies*—at the rate of £5 p N^{o}—for 45 numbers. This was V. Voorst's own offer, and as I thought it a fair one, I at once accepted it.
>
> I wish you would follow up with "A History of Br. Fungi"—on a similar plan,—& probably V.V. would undertake it. As possibly 2500 plates might *frighten* him, you could propose to put several of the small species in one plate, so as to bring the work within 500 plates. Such a work would be hailed with welcome by many, and if you could only find time for the drawings on stone, or find any friend to do them for you, I think it quite probably [*sic*] that V. Voorst would be accessible.

Some tempering of this enthusiasm for the project must have followed W. J. Hooker's reply to Harvey's letter of 7 May (see above), in which permission to stay at Kew and work under Fitch for a fortnight at lithography was requested. Clearly, Hooker's letter was dampening so far as lithography was concerned, since Harvey's reply on 14 May [1845] (W. J. Hooker, English Letters, vol. **23**, f. 278, 1845) began:

> I feel much obliged to you for the very full & candid manner in which you have gone over the pro & con of my undertaking with V.V.—& your letter has convinced me of my inability to do proper justice in lithography to the work. I have therefore written him decidedly declining to undertake the lithographic plates—but as I own I have still a longing after a book of the kind, if it could be compassed, I have left an opening for *etching*—which you know I once dabbled in, and mean to rub up my faculties & try and scratch a copper. You may be sure that I shall make certain of his meaning in the £225, before I close. I look on that sum as *clear*—"compensation to the author for his labour"—& consequently that the expence [*sic*] of copper (which would not be more than £7* or £8) & carriage &c should fall on the publisher.
>
> I shall minute my time too in the matter of etching, & if it take as much as you report of lithography, it will of course act as a bar.
>
> I enclose you my letter to V. Voorst, as I have quoted your opinions pretty freely, lest I should have done so incorrectly—& will feel obliged by your sealing it & throwing in the post.

Note here the rapid change of tune from the letter to Berkeley (9 May 1845), in which Van Voorst's offer was thought fair and at once accepted, to the letter to Hooker (14 May), in which as a result of W. J. Hooker's counsel Harvey decidedly declined to undertake the lithographic plates. The comments on expense of copper for the etching which Harvey hoped Van Voorst would be willing to contemplate in place of lithography were Harvey's in both letter text and footnoote. Clearly Hooker did 'throw' Harvey's letter to Van Voorst into the post after perusal, since it has not been traced amongst the Kew Archives; no copy seems to have been taken by Hooker and it is lucky that the content is more or less evident from the cast of the rest of this and other closely contemporaneous letters.

Harvey continued to keep Berkeley well-informed of the progress of events in a further letter (Berkeley Correspondence, vol. **6**, GREV to HOO) of 21 May 1845, from Trinity College, Dublin:

> A damper has fallen on my Seaweed Book, which may stop it altogether. Sir W$^{\underset{.}{m}}$ J. Hooker most strongly urges me not to undertake lithographic drawing, on account of its great labour & uncertainty. His experience in the matter is so great that I own myself staggered by what he says—& if I cannot execute the drawings, of course it cannot go forward.

These last two letters make it very plain that Harvey had by no means fully relinquished the overall idea of this type of publication.

J. D. Hooker's letter of 9 May 1845 to Harvey (see above) obviously produced a reply [not traced] from the latter that included suggestions as to some of the species he was going to use for rough sketches under Fitch's tuition at Kew. In a wide-ranging letter of 30 May 1845 from Edinburgh, J. D. Hooker included a paragraph that must have again had the effect of somewhat raising Harvey's spirits in concurring with his choice of trial species (Letters from J. D. Hooker, vol. **5**, GRA–HAR, ff. 222, 223):

> As to lithographing; it is as you find it no joke, nathless your zeal will be able to do something. I do not think that you could have chosen two better trial subjects than Dasya & Delesseria, after them you & we will be better able to judge of your chances of success.

Despite this boost, Harvey's feelings about his ability to cope with the task continued to vacillate frequently and widely. He wrote again to W. J. Hooker (English Letters, vol. **23**, 1845, f. 279), on 3 June 1845:

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*A blunder! I find it would be nearer £70 or £80 ! or £50 at least.—
[N.B. This is Harvey's footnote which forms part of the above quoted letter.]

> I have every reason to be obliged to you for saving me from the drudgery of lithography into the depths of which I was so thoughtlessly rushing. I am now convinced that both *it*, & *etching* are beyond my capabilities, without giving up more time to them than they are worth. Had I as great artistic facilities as Greville I might succeed, but my weak drawing will not bear to be still further weakened by doing it on stone or copper. Van Voorst writes very fairly, and is quite convinced that you have taken a just & dispassionate view of the case—which neither he nor I did. Still, he wishes (I think) to bring out a book on seaweeds which would range better with his other works than the Manual does. And I intend to prepare a set of sketches (*in pencilling only*, my dear friend) partly intended for Woodcuts, partly for copper plates, & by combining the two modes of illustration I propose greatly to cut down the number of plates:- and I think I can bring the work within moderate limits, without injury to its beauty or value. The letter press I propose to throw more into the form of chapters—with vignettes & tailpieces—which is a style Van. V. likes, I know, better than the synoptic form. I mean to prepare a *specimen*, both of letter press & illustration & take over with me. Of this therefore anon.

The general idea expressed in this letter now trends very strongly in the direction of what finally and later emerged as Harvey's *The Sea-side Book*, a text covering in chapters a wide spectrum of marine matters, including biota, and illustrated by delightful vignettes throughout. Published by Van Voorst firstly in 1849, this passed through at least four editions and proved a very popular 'little' work. Harvey's directional changes here caused W. J. Hooker to respond with some satisfaction and with something of a note of relief in a brief section of an undated letter (Sir W. Hooker's Letters to Dr W. H. Harvey, **1832–1860**, f. 185) that (despite being labelled during curation as 1846) clearly dates from June 1845:

> I am glad you have not thought me too severe upon your plates of Algae. Pencil sketches in illustrations of Algae I am sure you will do well & I think it will suit Van Voorst's purpose admirably.

Later (28th) in June, 1845, Harvey again wrote to W. J. Hooker (English Letters, vol. **23**, f. 281), describing his plans for the summer after Trinity College went down on 8 July. These included a visit of a month or two to the shores of Dingle Bay ('Ross Bay,* outside Castlemain Harbour'), during which he proposed 'While on the shore I shall employ myself making sketches from fresh specimens of all the Algae I can lay hold of—& about Sep^{t} hope to have these so far advanced with as to be able to show to V. Voorst.' Ross Bay was 'within 4 hours drive of Killarney' and it was from Roche's Hotel in the latter that Harvey wrote on 21 August 1845 to M. J. Berkeley (Berkeley Correspondence, vol. **6**, GREV to HOO) of his disappointment with the shores of Kerry compared to those of West Clare and bemoaning that he had 'not heard from Sir W.J.H. for an age, nor from Joseph.'

On 15 September 1845, Harvey was at Plassey, Limerick, whence he wrote to W. J. Hooker describing his plans to leave for Cork on 17 September and to sail thence to Plymouth on 18 September, reaching Torquay on the 20th; after spending some days with Mrs A. W. Griffiths, he would leave for London on 25 September by steamer to Southampton and from there by railway. Harvey was worried that he would miss J. D. Hooker in London, the latter possibly being by then back in Edinburgh; nevertheless, and despite knowing that Walker Arnott would be staying at Kew, he hoped that the Hookers could still provide him with a bed. That they did, at least until yet a further, third, guest arrived, is clear from letters between W. J. Hooker and his father-in-law, Dawson Turner (Sir W. J. Hooker Letters, **1845** to **1851**; letter of 25 September 1845), and from Harvey to Berkeley on 27 September 1845 (Berkeley Correspondence, vol. **6**, GREV to HOO). The latter indicated that Harvey arrived in Kew on 26 September and was probably going to stay there for a fortnight, having already passed a few pleasant days with Mrs Griffiths.

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*Location = Rossbehy, rendered as 'Ross Begh' by Harvey in pl. 321 text.

The lithography lessons, despite all the previous doubts as to ability on Harvey's part, *did* take place at this time. The usual correspondence with the Hookers is, naturally, lacking during this period, but Harvey wrote to Berkeley on 7 October 1845 (Berkeley Correspondence, vol. **6**, GREV to HOO) from West Park, Kew:

> Here I am taking lessons in lithography under Fitch, & find stone drawing not unpleasant work. Enclosed are proofs of my 1st & 2nd lesson, which I have shown to Van Voorst, who thinks they will do—& I have nearly arranged with him to bring out "A History of Brit. Seaweeds" in monthly numbers—with figures of *all* the species—in other words 360 Royal Octavo plates.—This will be a lengthy job—but a very pleasant one—& will, I hope, open the way to a similar book on Exotic Algae to be called "Icones Algarum" &c &c—a work for which I have abundance of materials.

A note added, before sending, by Harvey along the letter margin indicated: 'It is intended to *touch* the plates with *hand colouring*, so as to bring out the character better—& some will be altogether hand-coloured.'

Notice the renewed optimistic swing back towards the plan outlined in letters from Harvey to W. J. Hooker on 7 May 1845; to J. D. Hooker on 7 May 1845; to Berkeley on 9 May 1845. All these are quoted in detail earlier in this study. It is fortunate that the 'proofs' of the lessons referred to above in this latest letter have now been traced (Plates 4 & 5); these were for long apparently lost. That these 'proofs' were also really effectively proof forms of plates that finally did appear in the *Phycologia Britannica* and not simply copies of irrelevant attempts during the learning process at lithography by Harvey is clear, both from the illustrations presented as comparative plates of lesson and final *Phycologia* plate form (Plates 4 & 5) and from previous advice in the letter from J. D. Hooker (30 May 1845, from Edinburgh; see earlier), advising Harvey that his idea of *Dasya* and *Delesseria* as proof subjects was good, as well as from that letter, quoted below, from W. J. Hooker to Dawson Turner. It is by no means impossible that amongst the 'proofs' of lessons finally used were some, referred to in the letter above to Berkeley in part, that actually did involve *Dasya* and additional 'species' of *Delesseria.*

W. J. Hooker wrote to Dawson Turner (Sir W. J. Hooker Letters, **1845** to **1851**, HOO–) on the same date (7 October) as did Harvey to Berkeley. He (WJH) remarked on the fact that Turner was going imminently to pay them a visit and that Harvey especially wanted to meet Turner, continuing 'He [Harvey] is working at a Monograph of British Marine Algae & the enclosed is a specimen of one of his plates.' Fortunately in a way, the Dawson Turner papers were examined by Hooker, as his son-in-law, after Turner's death and letters that had been written by Hooker to Turner were re-possessed and incorporated into the retained correspondence collection of the Hookers. Thus, this information is being quoted from the actual letter that Turner received from W. J. Hooker, not from the draft (if any) that Hooker first put together. Both Turner and, subsequently, W. J. Hooker preserved the proof copy of Harvey's plate sent by Hooker to Turner—it is a red proof *printed* copy of a plate actually finally used in *Phycologia Britannica*, which must mean that assuming (and there is no real reason to doubt this) it to be that sent by Hooker to Turner, the Hookers, Van Voorst, and Harvey between them must very quickly have set up an efficient system of trial printing of Harvey's lithography done under Fitch's supervision at Kew. This proof plate has been annotated by Harvey himself 'Callithamnion gracillimum. Ag. Pier, Torquay. Mrs. Griffiths.' and by W. J. Hooker 'for D.T.'. *Callithamnion gracillimum* was Harvey's 'Lesson N$^{\underline{o}}$ 2' (see Plate 5) and was eventually published as plate no. 5 in the first monthly part of *Phycologia Britannica*, that for January, 1846. *Delesseria Hypoglossum* ('Lesson N$^{\underline{o}}$ 1'; Plate 4) was published as plate no. 2 in the same part and *Delesseria ruscifolia* as plate no. 26 in part 5 of the work. Other members of the Delesseriaceae (Rhodophyta) were published as plates 9 (part 2) and 23 (part 4). The first *Dasya* (*D. ocellata*) appeared as plate 40, part 7.

Harvey was still with the Hookers some days later and it is during this early October period that the hitherto invisible competition between Reeve and Van Voorst for the publication of the finally-named *Phycologia Britannica* emerged fully fledged. It is for this reason of juxtaposition and consequent conversational contact that there is relatively little correspondence evidence for what occurred, although the situation can be readily deduced from the few letters and other sources available. The most useful prime source is the letter from Harvey to Berkeley, written from West Park on 10 October 1845 (Berkeley Correspondence, vol. **6**, GREV to HOO). Part of the reason for J. D. Hooker's absence in Edinburgh during Harvey's stay at Kew was the selection process at that time of the next Professor of Botany in the University at Edinburgh, for which J. D. Hooker was a candidate; in the event, Hooker failed in this, and a large part of Harvey's letter to Berkeley is taken up with explaining the general understanding that Balfour had been selected before the Council actually met, and in debating whether Balfour could accept the financial aspects of the post. Harvey then continued:

> My latter drawings are much better than those you have seen—& I have *2* Publishers bidding one against the other for the Work! This enables me in great measure to dictate terms—which of course I do pretty strongly. I have refused £360 for the copy-right—& have now an offer from Reeve's, which will probably put £600 in my pocket—a serious difference. Sir W^{m}. has generalled for me famously in this instance.

Details of what that £600 actually meant are available in a letter, written in The Athenaeum, London, on Saturday, 11 October 1845, from W. J. Hooker to Dawson Turner (Sir W. J. Hooker Letters, **1845** to **1851**):

> I have come into town to assist Harvey in arranging for the publication of the British Algae:- & I think I have done well in finding him a publisher who will give above £200 for the work whatever be the sale. £300 if the sale amount to 250 copies & £400 if it reaches 300 copies.

It is curious, although doubtfully significant, that Hooker nowhere mentioned Reeve's name in this letter to Dawson Turner.

Shortly after this, Harvey left Kew, more skilled at lithography and presumably now convinced that he was so, to return to Trinity College, Dublin. Although I have so far traced none of the letters concerned, he was clearly in consistent contact with Reeve over the matter. A letter from Harvey to W. J. Hooker, from Dublin, on 27 October 1845, makes this plain (W. J. Hooker, English Letters, vol. **23**, 1845, f. 288):

> Reeve wants *another* change! namely—to print the broad fronds in pale black, instead of in colours. I told him I did not think they would look equally well, and would require four times more hand colouring—as the shadows would then equally require hand colouring with the frond. I suggested his asking your advice. Certainly they will look *less like seaweeds*, & more like *plates*, if printed in black. I am not yet at work, not having received the box of stones—which may still be ten days out.

At this point, Harvey was clearly champing at the bit to get on with lithography whilst he remained buoyed up by new enthusiasm and belief in his ability. This did not cause him to neglect his usual pattern of publicizing the position to his interested friends and professional colleagues. Some days before the above letter, he had clearly done just that when writing to John Ralfs, because the latter, then staying in Ilfracombe, wrote to Berkeley (Berkeley Correspondence, vol. **10**, RAL–THW), to the effect that:

> I had a letter yesterday from M^{r}. Harvey. he tells me he intends commencing on the first of January a work on the British seaweeds to contain figures of every species in numbers containing 6 Plates each. he does not include the Diatomaceae and suggests my publishing a work upon them to include both marine and freshwater species.

Two further relevant letters from Harvey to W. J. Hooker followed close on this. These

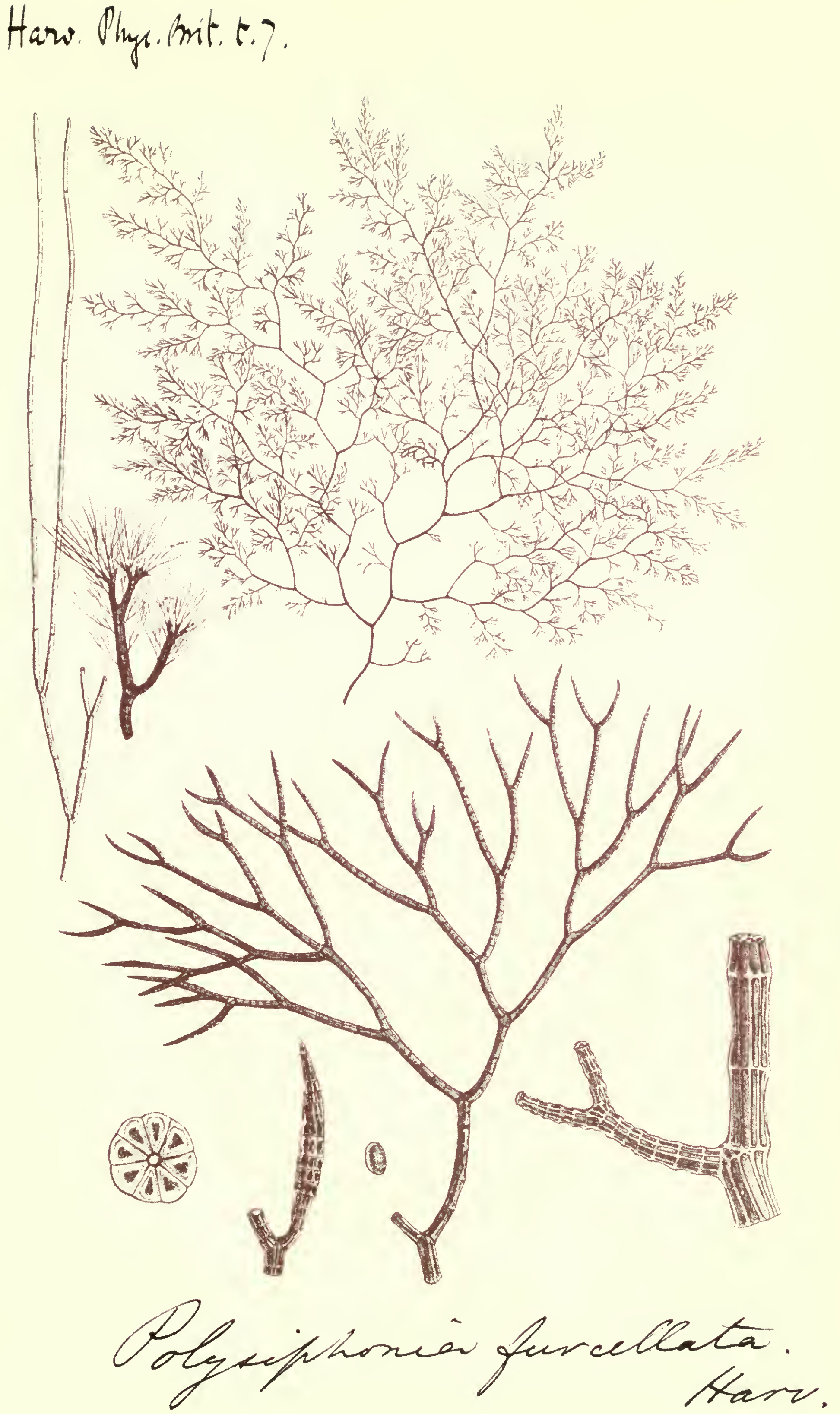
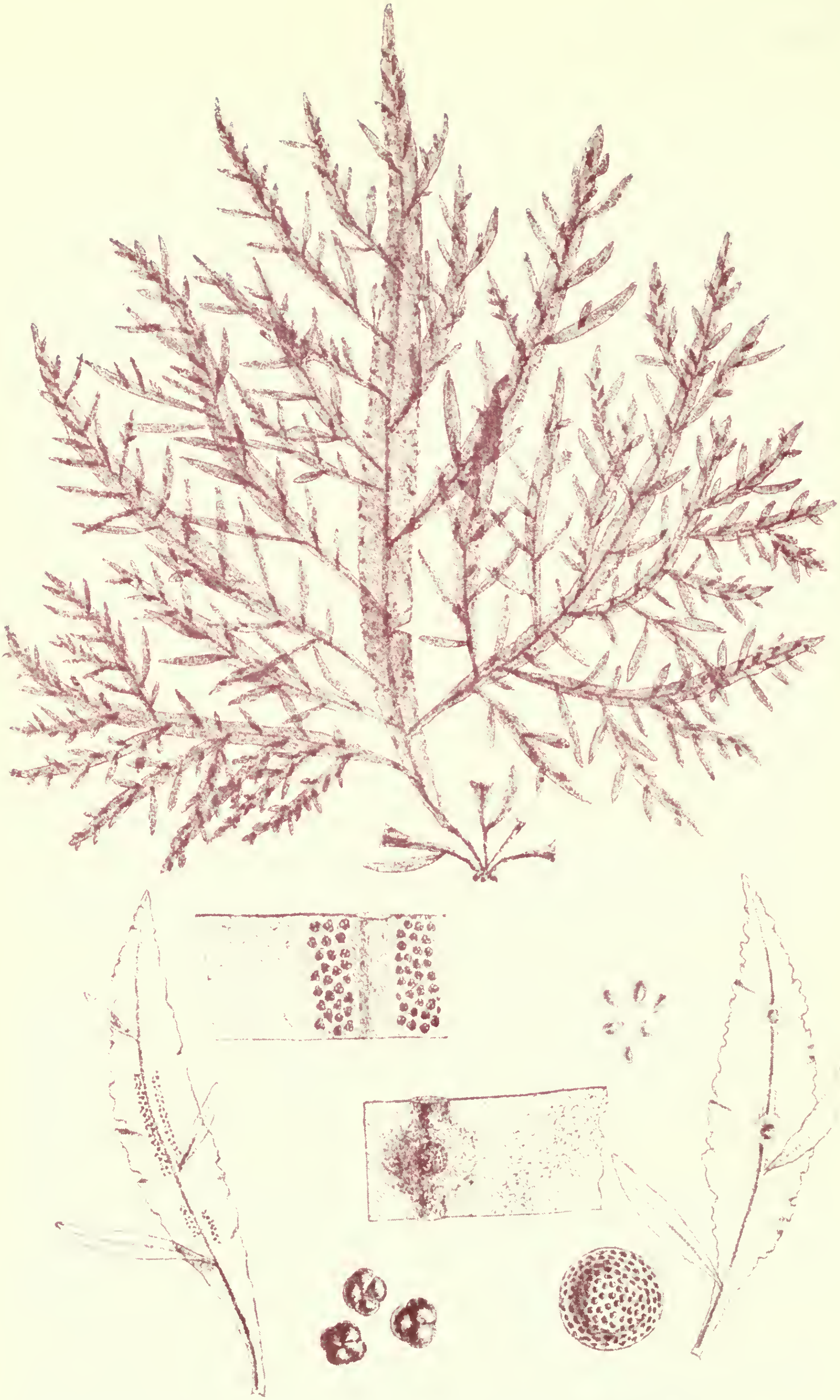

Harv. Phys. Brit. t. 7.
Polysiphonia furcellata. Harv.

Plate 3 A coloured proof pull, sent folded through the post from Harvey to W. J. Hooker. The species name and authorities are in Harvey's hand.



Delesseria hypoglossum. Ag.

W. H. H. lith.

Leſson N. 1.

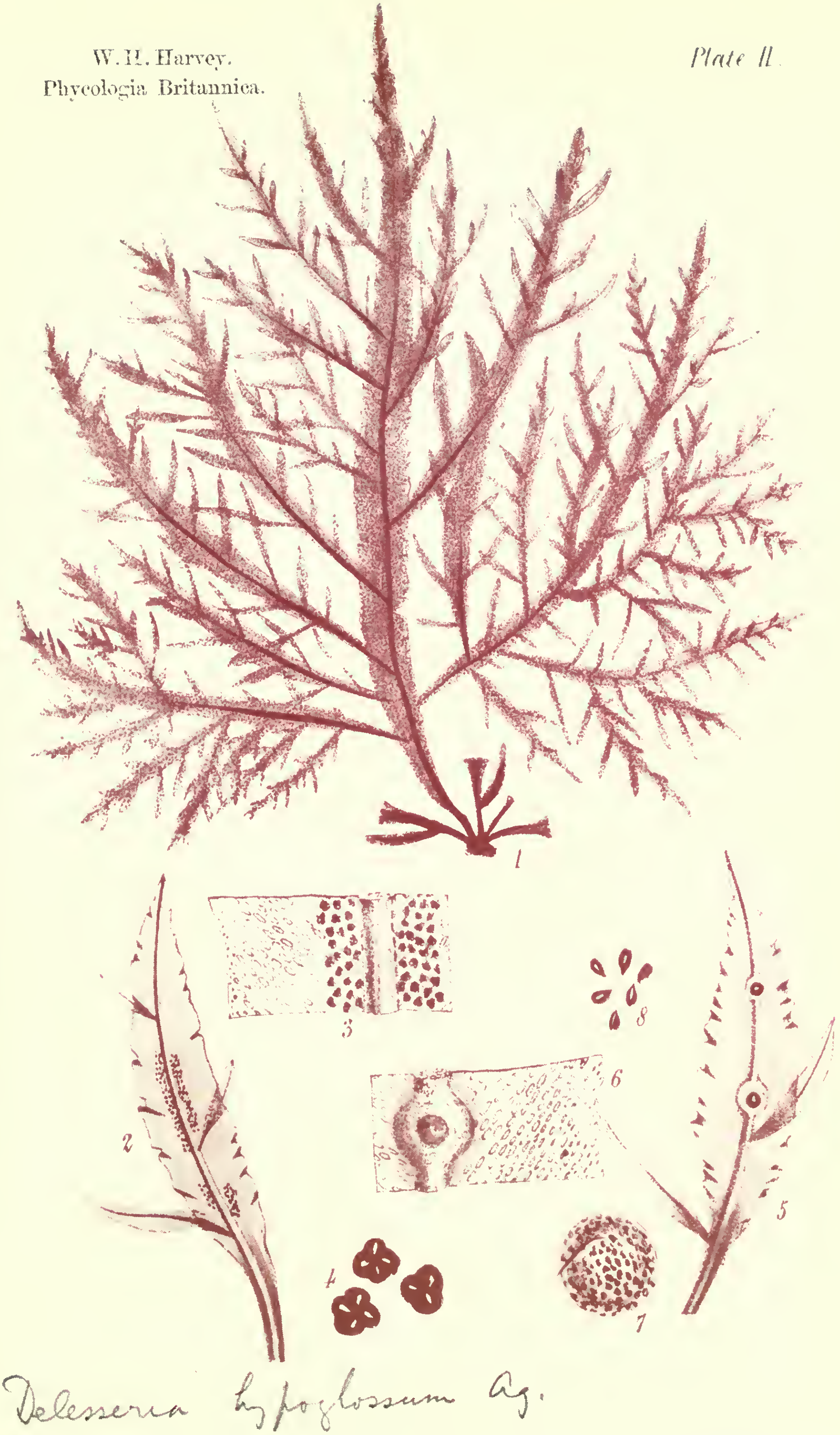
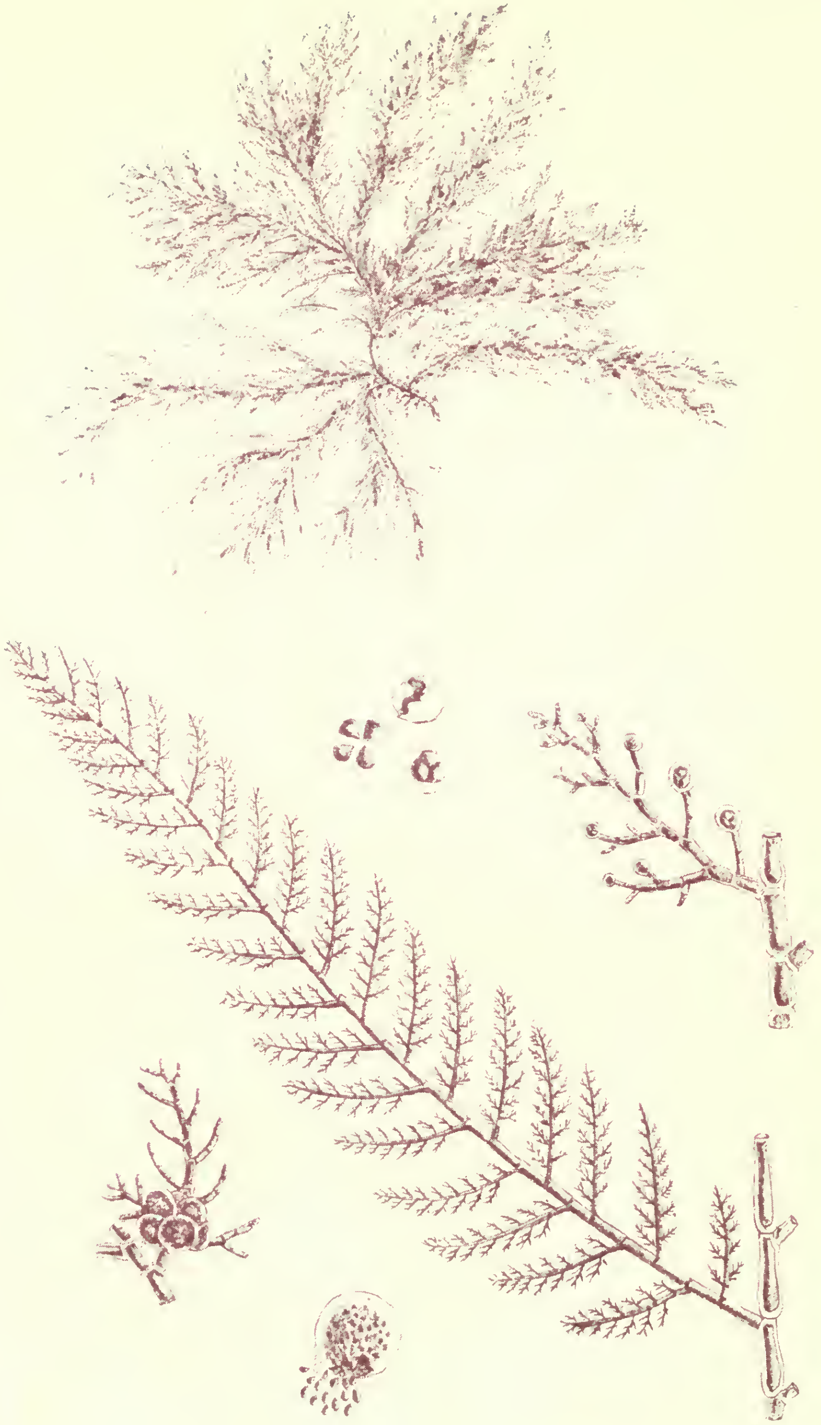

W. H. Harvey.
Phycologia Britannica.
Plate II.
1
2
3
4
5
6
7
8
Delesseria hypoglossum Ag.

Plate 4 (left) 'Lesson 1': see pp. 99–104. The annotations are in Harvey's hand. **Plate 4** (right) Plate 2 of the work as issued.



Callithamnion gracillimum Ag.

W. H. H. lith.

Lesson Nº 2.

Plate V.

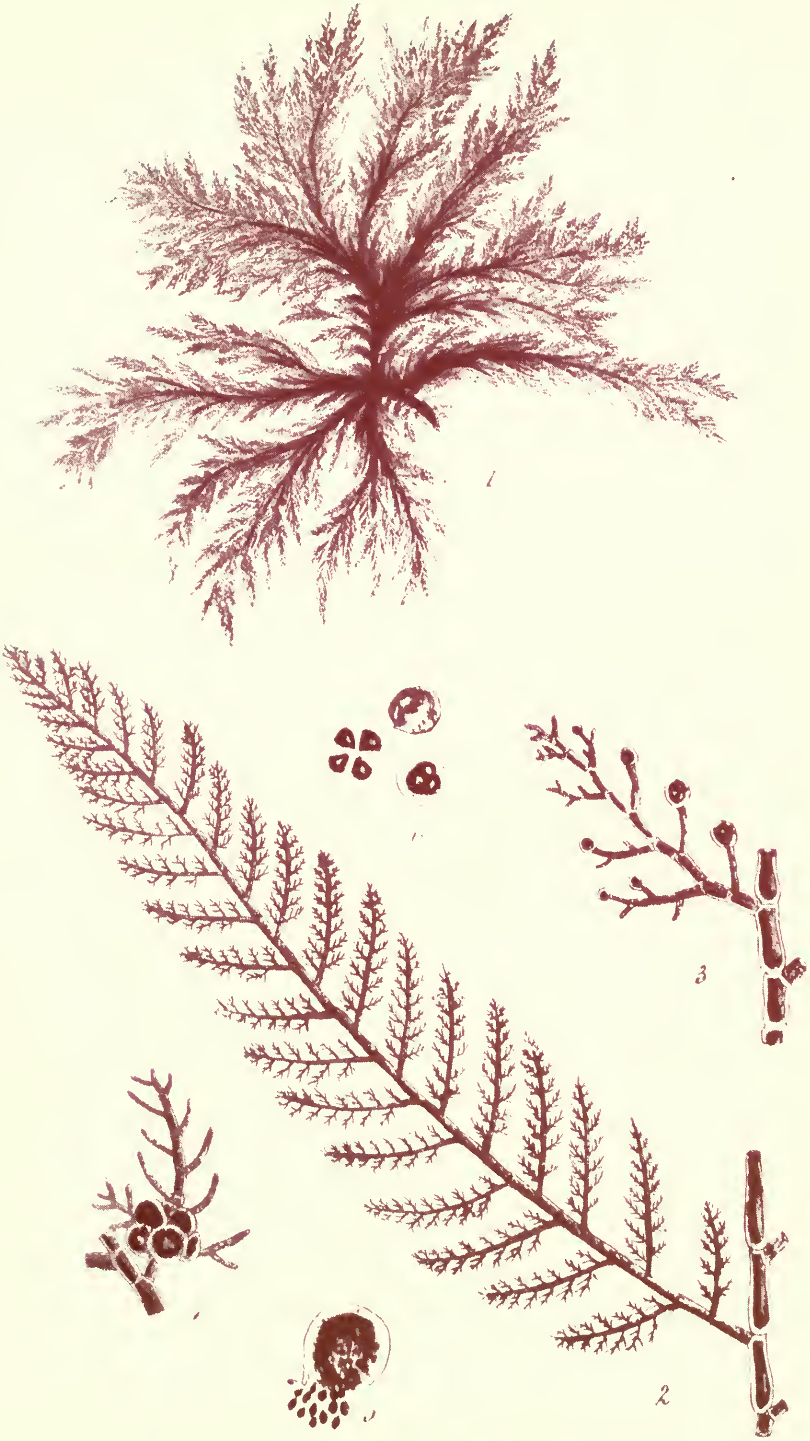


Plate 5 (left) 'Lesson 2': see pp. 99–104. The annotations are in Harvey's hand. **Plate 5** (right) Plate 5 of the work as issued.

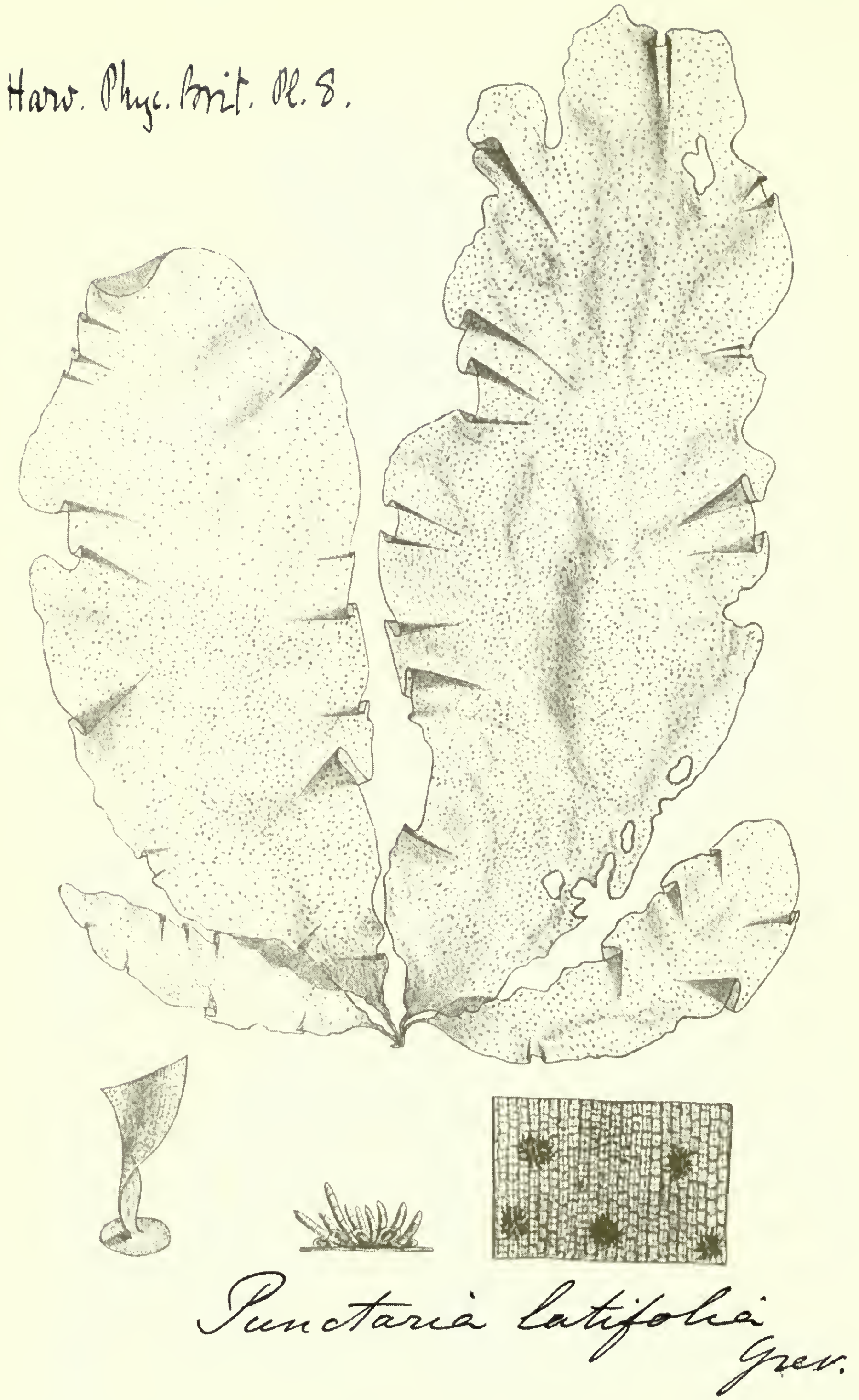

Harv. Phyc. Brit. Pl. 8.
Punctaria latifolia
Grev.

Plate 6 A coloured proof pull, sent folded through the post from Harvey to W. J. Hooker. The species name and authorities are in Harvey's hand.

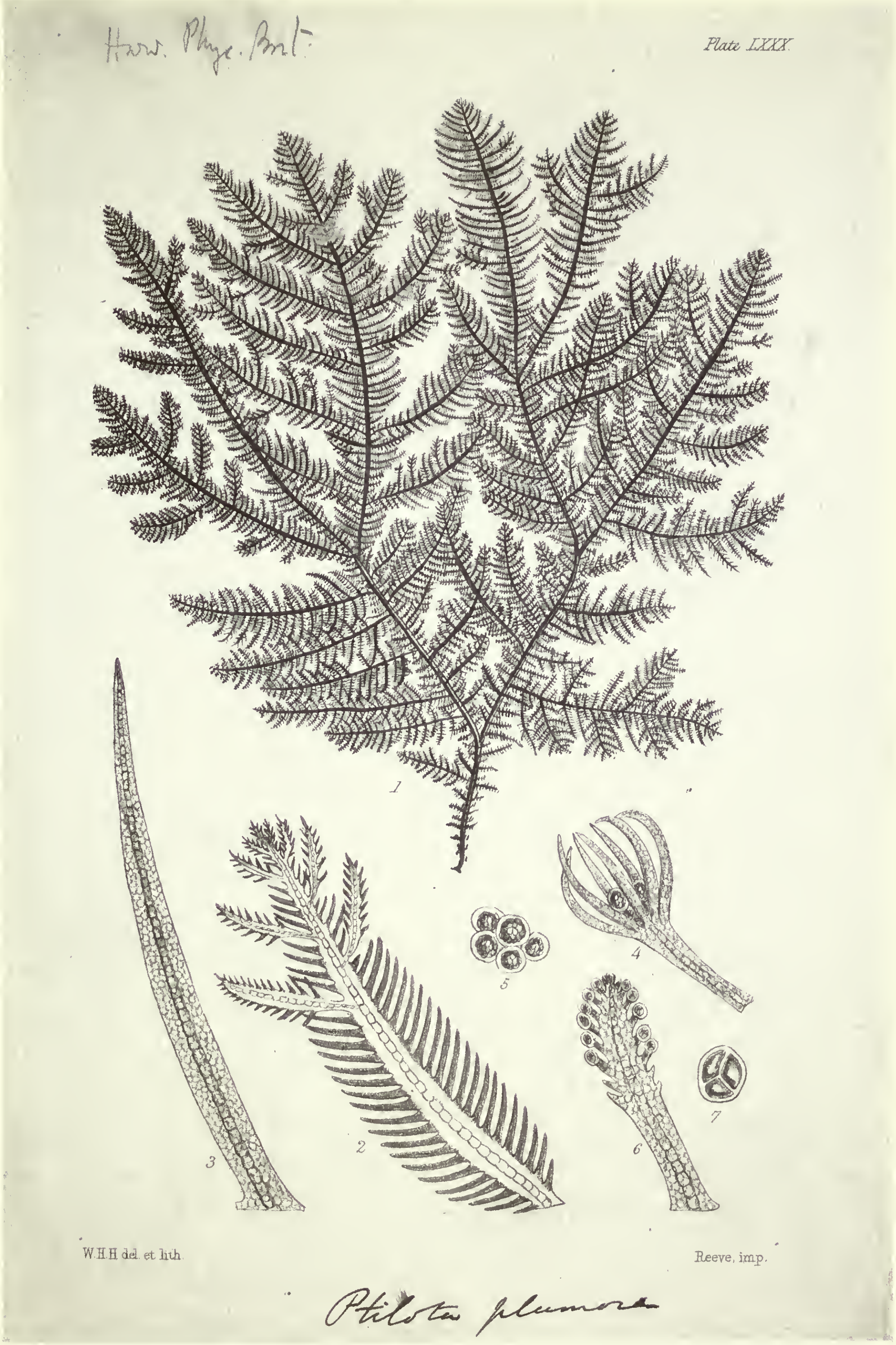

Harv. Phyc. Brit.
Plate LXXX
1
2
3
4
5
6
7
W.H.H del. et lith.
Reeve, imp.
Ptilota plumosa

Plate 7 A black ink printed proof pull/early plate state, clearly folded for sending through the post, probably to the Hookers. The species name for this early state of plate 80 (*Ptilota plumosa*) is in Harvey's hand.

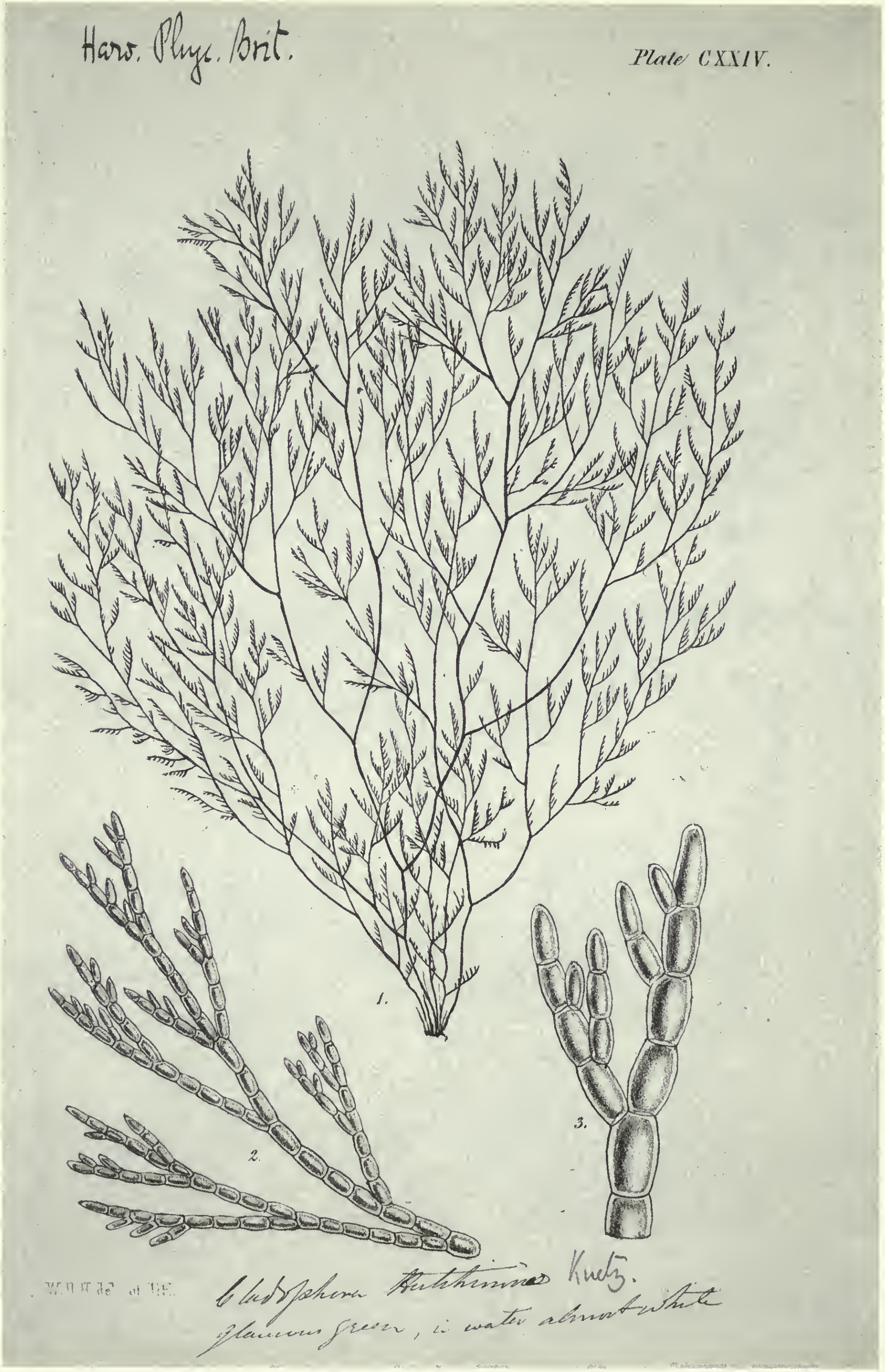

Harv. Phyc. Brit.
Plate CXXIV.
1.
2.
3.
Cladophora Hutchinsiae Kuetz.
glaucous green, in water almost white

Plate 8 A black ink printed proof pull/early plate state; the annotations ‘Cladophora Hutchinsiae . . .’ and ‘glaucous green, in water almost white’ are again both in Harvey’s hand.

letters (W. J. Hooker, English Letters, vol. **23**, 1845, ff. 289; 290) were dated respectively to 31 October 1845 and 6 November 1845. On 31 October, Harvey observed:

> *Reeve* has *broken out in a new place*—but this time with my hearty good will & approval. He determines to print 1½ to 2 pages to each plant, giving them as much printing as in Grev. Crypt. & the Bot. Mag. It comes easier to me, as I was rather *bothered* to get what I wanted to say into a single page—and it will make the book look much handsomer.

One week later, the relative merits of black and colour printing for the plates were being strongly debated:

> I have just received the enclosed from M^r^ Reeve.—Are they not IMMEASURABLY [*sic*] superior to *black* ? I think so—, and am unwilling to order him to print in black such subjects as Punctaria & Asperococcus—Surely the reticulations come out strong enough. I have no *black* proof, (having returned the one he sent me), but if you will be so good as to get from him the patterns of these plates, struck in black, *which I coloured*—& then get Fitch merely to wash over those now sent, I feel almost certain that you will alter your opinion as to *colour-printing*, for *these plates*. I am quite aware, that by putting less shading in, they would look well in black; but pray remember that these two plates were shaded with the expectation that they should be printed in colour—& they look quite *sooty* when printed in black.
> For *future* plates of broad plants I am willing to be guided by you, but then I shall not shade them nearly so strongly—saving myself thereby much trouble. . . .
> Pray be good enough to forward *Asper. Turneri* to Mr. Turner.

Clearly, the pace of correspondence between Reeve and Harvey was at this time unflagging, and between Harvey and W. J. Hooker almost equally so. Indeed, this was undoubtedly the critical period for the whole work and therefore for the years 1846–51, in that policy decisions reached in late 1845 were going to affect irrevocably the final form of time-structuring and of product. The most critical of these policy decisions was that of the matter of colour *cf.* black printing, particularly in the cases of broad plants. This is almost certainly the explanation behind the odd mosaic distribution of presence/absence of 'black engravings' from *Phycologia Britannica* referred to in the following comments (Prof. D. A. Webb, Dublin, *in litt.*, 13 January 1981), for which I am much obliged: 'I looked at random through the folders of a number of British species, and find that a minority, though a substantial one, have uncoloured engravings from the *Phycologia* pinned on to the sheets. Each has its name written at the bottom in Harvey's writing, so I am pretty certain it was he who pinned them on. But why some species have them and many others do not is something for which I can offer no explanation.' The presence scattered throughout the Harvey material of a mosaic of black and/or coloured proof pulls (British and Australasian) attached to the Trinity College Herbarium sheets of algae has also recently been kindly confirmed by Dr Alan J. K. Millar of the University of Melbourne.

The reason for the absence from the correspondence files of at least one of the 'black'* proofs referred to by Harvey in his letter of 6 November 1845 to W. J. Hooker has been established as being that Hooker complied with Harvey's wish that he (Hooker) send the proof of '*Asper. Turneri*' on to Dawson Turner. The others may still prove all to be extant in one location or other when data from Dublin, Kew, BMNH and elsewhere are all collated. As will emerge shortly this, in correspondence at least, was not the end of the debate on colour *cf.* black printing of the *Phycologia Britannica* plates. See Plates 3, 4, 5, 6, 7 and 8 for comparison of coloured with black proof or early plate states.

The rest of the month of November 1845 was also productive of correspondence, and of information derived from it, on *Phycologia Britannica*. W. J. Hooker replied to Harvey's letter on colouring of broad plants in his own letter dated only to 'Monday Eve'. This can only have been 10 or 17 November, in 1845; probably it was written on 17 November, since the plate of *Asperococcus Turneri* was sent to Dawson Turner with a covering letter dated 22 November and Harvey's letter, to which the following is a reply, was not written until 6 November. Hooker's letter (Sir W. J. Hooker's Letters to W. H. Harvey, **1832–1860**, HOO, f. 216) commented:

> I think when I spoke of printing your *broad* Algae *not* in colors, I spoke of doing so in *pale* black or grey. Under these heads I should class the color of your Punctaria & Asperococcus*:-that is, I presume you do not call them printed in colors ??—they are a neutral tint well suited to bear coloring:- but are not I presume in their present state the color of the plant. I never intended or thought of a *dark black*. Indeed I think we quite agree upon this subject. I send the Asperococcus Turneri to Mr. Turner.

Sometime during early November, or perhaps rather late in October, Harvey and Reeve issued a Prospectus, to which reference was made in two letters: one of these, from John Ralfs to Berkeley (Berkeley Correspondence, vol. **10**, RAL–THW) on 15 November, drew a comparison between the cost of the proposed work by Ralfs and that for the parts of *Phycologia Britannica*, Ralfs commenting that as soon as the price of his Monograph was determined, he would issue a Prospectus. A few days later, Berkeley was asked by Mrs Amelia W. Griffiths, with whom Harvey had recently stayed for some days in Devonshire, in her letter of 19 November (Berkeley Correspondence, vol. **6**, GREV–HOO), 'you have I suppose seen a prospectus of his [Harvey's] intended new work'—this in the context of Harvey's recognizing instantly a plant of *Chylocladia reflexa* that Mrs Griffiths had found and of his intention to describe it as a British species.

During the last ten days of November, another potential teething problem developed for *Phycologia Britannica* and its maturation. Harvey wrote to J. D. Hooker on 21 November (Letters to J. D. Hooker, vol. **11**, f. 32):

> I am in a fix—from which I beg you—of your charity—to relieve me. Charity, you know is "easy to be entreated" + so I hope yours will be.
>
> The Amiable Reeve wants a *woodcut* to put on the cover of the Phycologia—& suggests, as most appropriate, a group of seaweeds. I am a miserable hand at grouping, & besides, it is difficult to find many which would do for a woodcut. The *Laminariae* appear to me most suitable & I have endeavoured to make a mixture (alas! it is a *mess*) of them. Such as it is I enclose it herein—& my prayer is, that you, of your clemency, would cause Mr. Fitch to improve or remodel said group—so as to meet yours' & Sir W$^{\underline{ms}}$ approval—& to stop Reeve's mouth.
>
> When remodified, please send it to Reeve who writes that "wood engraving is a very slow process"—& therefore urges despatch.
>
> I have done 8 new plates—and think I improve as I go along—& certainly find it easier to use the brush. Reeve permits me to give an occasional *quarto to reckon as an octavo*—AT MY REQUEST:— that is, to give a quarto plate now & then without reckoning it a *double* plate. I know you dont approve of this mode of reckoning, but *I* do.

Very few of the parts of *Phycologia* with intact covers (wrappers) are known; some (29) are fortunately in my possession, and the woodcut from one of these is illustrated in Plate 9a. It is, in fact, the same woodcut (Plate 9b) as that which appears on the title-pages issued for the

---

*The original letter, referred to above, from W. J. Hooker to Dawson Turner of [probably] 22 November 1845 was retrieved from Turner's correspondence as detailed previously and re-incorporated in the Hooker correspondence files, now held in the Archives Room, Royal Botanic Gardens, Kew. It is filed as a leaf in the volume of Sir W. J. Hooker Letters **1845** to **1851**, HOO–. The proof copy of the plate of 'Asperococcus Turneri Hook', so annotated by Harvey, remains with it. W. J. Hooker's referring this proof colour to his class of '*pale* black or grey' is liberal translation indeed; the proof is hardly even a 'neutral tint' and, despite what Hooker suggested, reasonably well represents the common colour of the plant, a pale greenish-brown. This, of course, makes the assumption that the proof copy now associated with the letter is the one on which Hooker was commenting when he wrote to Harvey in those terms.

overall completed volumes. The extent of change between the woodcut finally used and the '*mess*' referred to by Harvey as enclosed with his letter is not clear. The latter presumably was passed by J. D. Hooker to Fitch for comment and possible re-design, and seems not to have been re-associated with its original covering letter. It could either have been only slightly amended and actually used, or summarily dismissed and destroyed. Further evidence cannot be traced, although the grouping is clearly assigned "W.FITCH.DEL."

Similarly un-traced is interim correspondence between either or both of the Hookers and Harvey, and between any or all of these and Lovell Reeve, on the subject of the woodcut, between that quoted above from Harvey on 21 November 1845 and another from J. D. Hooker to Harvey on [?] 15 December of that year; the latter, although on the subject of the woodcut, is not a direct reply to Harvey's letter of 21 November and answers questions that had not yet then been raised. Another letter in this period does exist, from Harvey to W. J. Hooker on 26 November 1845; this is largely about Ralfs and his work on Desmidiaceae, which Harvey thought highly of and for which he was trying to drum up maximum support. The letter (W. J. Hooker, English Letters, vol. **23**, f. 291, 1845) contains only an incidental terminal comment on Harvey's own work:

> At present I am very busy with Lithography, & only get through 4 plates per week.

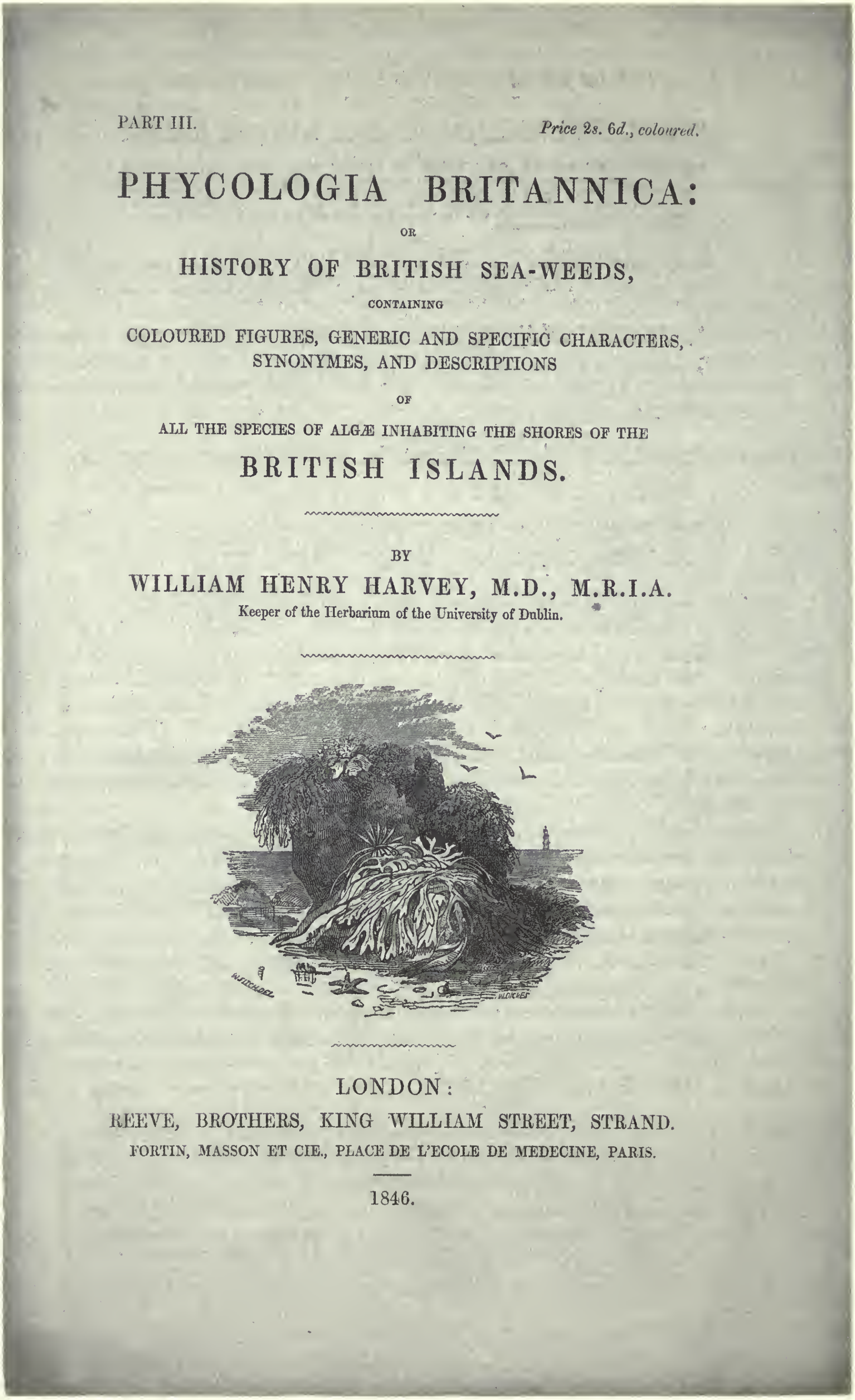
This comment, taken alongside that in the previously-quoted letter of 21 November, shows clearly that Harvey was aiming to build up a fair reservoir of available plates for *Phycologia Britannica* before issue of parts of the latter began, in order to 'stay ahead of the game'.

There is some doubt as to the actual dispatch date or date of writing of the letter from J. D. Hooker to Harvey and referred to above as ?15 December. Hooker had dated the letter only as 'Saturday', from Kew; '12/15 1845' has been added later in a hand not easily identifiable but clearly curational. That annotation *could* even have been added by Hooker himself in regard to the date he actually *sent* the letter, since this is one of the drafts in the 'Letters *from* J. D. Hooker' collection. Such would, in any case, tally well with the rest of the sequence; 15 December 1845 was a Monday, and probably therefore the earliest collection day after the letter's being written on the Saturday. This letter is certainly part of the group concerning the proposed woodcut for the *Phycologia* covers.

It seems likely from the phraseology in the ?15 December letter that Reeve had been pushing strongly the matter of the woodcut with Harvey and champing at the bit to get on with things in letters to the latter not so far traced. Amongst the bit-champing was, apparently, the suggestion that he (Reeve) should be allowed to supply the woodcut for the cover if Harvey could not do so with some dispatch, the cost to be shared between the publisher and Harvey, as author. This suggestion was clearly relayed by Harvey to J. D. Hooker (with the request that W.J.H. be consulted for his opinion) or direct to W. J. Hooker (who requested his son, J.D.H., when writing to Harvey to transmit WJH's opinion). However that may be, neither of the Hookers was terribly enthusiastic about Reeve's suggestion nor, for that matter, was JDH so about Reeve himself at that point in time, from the tone of his letter to Harvey (Letters from J. D. Hooker, GRA–HAR, vol. **5**, f. 229):

> My Fathers advice is *not* to go half with Reeves [*sic*] for such a woodcut as he will supply—I can see through it all; he wants the same man to do it who spoiled my vignette & which caused me to get another done at my own expense. (by another Artist. [inserted as an afterthought]) The man who wants a fortnight & does not understand the design is a wretched wood-cutter & no one wants a fortnight for such work, but such a one or else how is the Illustrated News & P.
> Times dashed out at a days notice ? & better done than Reeves man can do.

J. D. Hooker was here talking of aspects of his recent publications on the *Erebus* and *Terror* expeditions in the deep south, and was clearly incensed at what he regarded as doubtful professional conduct. The letter continued:



PART III. *Price 2s. 6d., coloured.*

PHYCOLOGIA BRITANNICA:

OR

HISTORY OF BRITISH SEA-WEEDS,

CONTAINING

COLOURED FIGURES, GENERIC AND SPECIFIC CHARACTERS,
SYNONYMES, AND DESCRIPTIONS

OF

ALL THE SPECIES OF ALGÆ INHABITING THE SHORES OF THE

BRITISH ISLANDS.

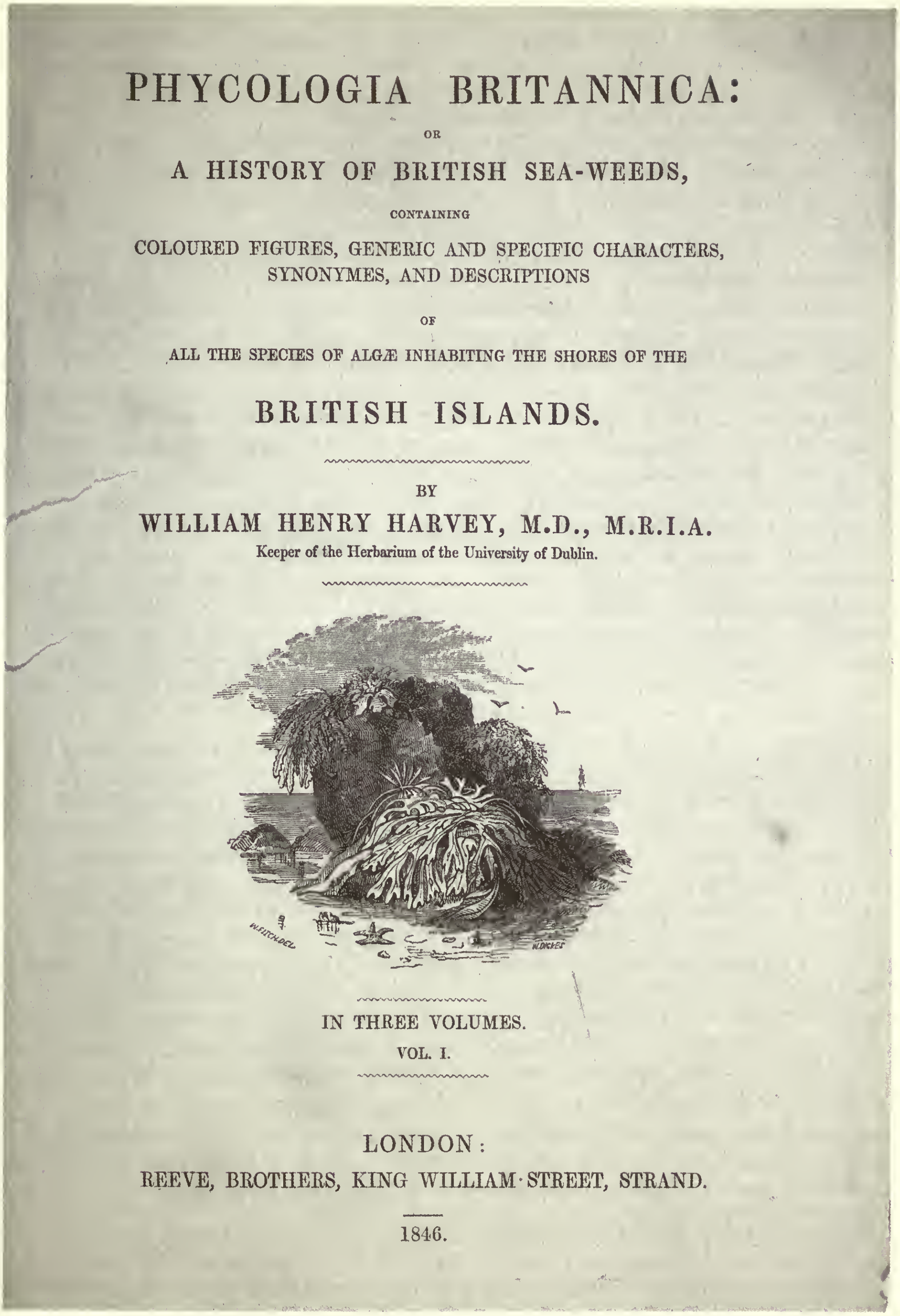
BY

WILLIAM HENRY HARVEY, M.D., M.R.I.A.
Keeper of the Herbarium of the University of Dublin.

W.FITCH.DEL.
W.DICKES

LONDON:
REEVE, BROTHERS, KING WILLIAM STREET, STRAND.
FORTIN, MASSON ET CIE., PLACE DE L'ECOLE DE MEDECINE, PARIS.

1846.



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W.FITCH DEL
H.DICKES

IN THREE VOLUMES.
VOL. I.

LONDON:
REEVE, BROTHERS, KING WILLIAM·STREET, STRAND.
1846.

Plate 9a The woodcut shore grouping used on the front wrappers of all the parts as sold. In this case, the example is of Part III. The paper on which it is printed is yellow—probably originally a pale lemon colour—and provides less contrast than that of the volume title-pages (see 9b).
b The same grouping, as used on the title-pages, here Volume I of the three-volume version (see 9a).

> Reeves [*sic*] sent to ask me for the Fuci represented, but he so dirtied some things I lent him before, that I would not send them, but referred him to plates for them. I suppose this has discontented him. The same man did not understand the Erebus—, 12 months ago & I daresay would have asked the loan of them, if he had thought it worth the while. We have had another row with him for advertising the century of Orchideae as if it was to be a wholly new work. He tried to shuffle out of it, by saying he had not even seen the advertizement when printed; but it is evidently an intentional trick, which some would call deceit. He has also been bothering Mr. Lyons early about his part of the work & wanting to screw a plan of his house (?) sections &c gratis out of him, refusing to pay the person Mr. L. would require to employ; ditto with regard to an Orchid. stone: of which he would like a reduced copy of the plan; I have been thinking since that Yarrell would have been the best person to apply to; do you remember the *tail-pieces* to his work on Fish ? little sea views with weeds &c. in the foregrounds. A coloured thing such as Reeves suggests would look vile. Reeves [*sic*] has never been bullied by me, I do conscientiously affirm that I have repeatedly let him off, when he has been very troublesome. His printer made 38 errors in a 1/2 sheet proof that came yesterday & left two lines out. The MSS was as clean & distinct as possible & I excluded in my numbers all errors of *a* for *k* & the like where ambiguity existed. The said 38 were wholly & entirely his own, & yet R.[eeve] sends me a complaining letter that he has to pay 5/– a sheet for *my* corrections of press, also that he will back his printer with any in London. He almost spoiled a stone for *E. Forbes* & laid the blame on the lithographer, but the same was sent to Hallmandle [Hullmandel] who took off purpul [*sic*] impressions from it. The conceited ass has just printed a paper full of confounded nomina in the Annales, declaring some naval friend of his has found that Cypraea change their shells: a very old story & mistake arising from the great similarity between a certain naked Mollusc, & the animal of the Cypraea.
>
> Pray do not for a moment think that I will be vexed at the rejection of my design, it is one of which Harvey the woodcutter or Sly would have made a very pretty thing, but to have had it picked out in ink as the lines on the woodblock are & which his woodcutter wanted, would take a great deal of time & is what a decent artist does not want. My Father says you should not trouble about a cut at all, & at his advice I do not communicate with Reeves on the subject.
>
> The stones you enquired of from me once, are in the hands of Mr Davis at Galway, they are 2 lithographic stones & 2 zinc plates each 12 × 10 inches, the latter in a Mahogany box for travelling, with chalks transfer paper &c., they cost him £2..6 exclusive of carriage & as he cannot use them he would take what he can get for them. If you do lithograph much I would try Grieve, who is very reasonable & good & who does all with zinc. Fitch likes zinc as well as stones & the first plate of my book done on zinc & printed by Grieve was much better than Reeve's done on stone.

The same general feeling of disillusionment and annoyance with Reeve continues evident in another letter from J. D. Hooker to Harvey, also from Kew, later that same month (30 December 1845; Letters from J. D. Hooker, GRA–HAR, vol. **5**, f. 228):

> I have directed enquiries to be made about the Trade price of stones & will inform you when I receive the answers, I should think Reeves [*sic*] will be reasonable but can't tell, he is a curse & there's an end on it. he has *not printed one line of my flora all this month* & annoys me in fifty ways. What do I hear now?, not content with his business he makes an ass of himself as a lecturer on Nat. Hist. in some Surry [Surrey] institution; Further he attends Bickersteths Sermons at the Magdalen & sends him critical letters on them signed L.R. ! No wonder he has too much on hand; if this is the way things are to go on I must

> come to air open Rumpus with the blockhead. I do not wonder at your being enlivened at getting a remittance from the C.B.S. publisher, was it not Rokestone, I think I remember him, a very civil fellow, I wish he would change places with L.R.

Rather full quotation from the last two letters mentioned of J. D. Hooker to Harvey has been a requirement; apart from the general importance of the process by which the vignette woodcut was generated and of the background to the lithography that was to be a major preoccupation for Harvey over the years ahead, this full quotation permits comparison between the present attitude to Reeve, which must also largely have been common to Harvey, and that evinced through letters but a few days removed in time from the present series, although nominally dating to 1846 and across the great divide created by the appearance of Part 1 of the *Phycologia Britannica*.

Events after publication of Part 1 and contemporary opinions of the work

The Events

The early days of January 1846, brought with them what is virtually a *volte face* in at least Harvey's side of the Harvey/Hookers correspondence on the subject of Lovell Reeve, his activities, his attainments, and therefore his status as regards that author's respect. Harvey wrote from Dublin to Sir William Hooker on 5 January (W. J. Hooker, English Letters, vol. **24**, f. 240):

> Saturday brought the 1st. no. of the Phycologia here.—Reeve has done his work well,—it looks respectable—though I see many defects in the plates. The coming ones will have fewer I hope. The woodcut looks very well—and is quite an improvement to the face of the book. I hope Reeve has sent you a *Quarto* edition. If not, let me know & I will row him.

In 1846, 5 January was a Monday, so that the first number reached Harvey in Dublin on 3 January; in turn, this must mean that it was posted promptly in London on or just before 1 January 1846 (Thursday). Reference back to Price (1984) will indicate that *The Athenaeum* carried on 27 December 1845 (Saturday) an advertisement to the effect that the part for January 1846 of *Phycologia Britannica* was announced (but not indicated as ready), so that it is possible that dispatch occurred on the Monday after (29 December). The delivery of copies to others must have been similarly rapid, although atypically the Linnean Society did not register receipt of their copy until 22 January 1846 (Price, 1984). J. D. Hooker was already writing to Berkeley in Northamptonshire on 11 January 1846 *in reply* to Berkeley's letter to him commenting on the first number of the *Phycologia Britannica*; hence, a copy must have reached Berkeley rather promptly for all that to have been possible.

Although there are variations in detail on the theme (comments are explored in detail in later sections and in Appendix III), the general tone of the reception of the early numbers was favourable. Some reservation was expressed by J. D. Hooker (Berkeley Correspondence, vol. **6**, GREV–HOO) in writing to Miles Berkeley on 11 January 1846, stating of the *Phycologia*: 'I do hope it will go on as well', although it was not clear whether he was reserved about content or, more likely, about maintenance of standard of production. Since Hooker then went on to say that: 'Reeves [*sic*] are giving up the shell business & devoting more fixed attention to the publishing', he very likely hoped that the latter would reduce the degree of preoccupation and increase commitment to long-term works such as the *Phycologia Britannica*. W. J. Hooker, who wrote to Harvey from Kew on 15 January (Sir W. Hooker's Letters to Dr. W. H. Harvey, **1832–1860**, vol. HOO, f. 168), joined the general enthusiasm, but somewhat drily observed: 'The Quarto [version] is duly come though not quite so soon as it should have done from some little error on the part of Reeves.' As a parting shot, he added: 'The Wood-cut might be better', an opinion not entirely consistent with Harvey's own (see his letter of 5 January).

Not long after this, on his thirty-fifth birthday (5 February 1846), Harvey still found time to write to Joseph Hooker stating somewhat prophetically (and, as it proved, optimistically) that, of his life, 'half the sands *at least* [his italic] ebbed out'. This deceptively calm statement is paraleled in the same letter by a devastatingly honest statement about his knowledge of Corallines (Letters to J. D. Hooker, vol. **11**, HAR, f. 34):

> My dear Joseph,
>
> I take it as a piece of *deliberate malice* you sending me the enclosed to name, when you know right well that I have not ten named Corallines in the world—that I do not even know the British species—though about to describe them—& that there are no books for foreign species. As far as I dare say the enclosed is Corallina Squamata of Ellis—see his plate 24. fig. c.c.—but "not knowing, cant say"!!—

Very much in the usual pattern of correspondence from Harvey at this time, only 5 further days elapsed before yet another missive was on its way to J. D. Hooker from Trinity College, Harvey this time (10 February) being much exercised by the matter of *Stenogramme interrupta*, held only in the Hooker Herbarium at that time and being requested by Montagne, in Paris. Asking Joseph Hooker to send him 'a morsel' for Montagne, Harvey went on: 'I must some day figure that said specimen.—' (Letters to J. D. Hooker, vol. **11**, HAR, f. 35). Harvey was here speaking of including the species in *Phycologia Britannica* which (on the basis of the specimen in Hooker's Herbarium at least) did not happen. *Stenogramme interrupta* was finally included in the *Phycologia*, as part 30, plate 176, published 1 June 1848, on the basis of what was stated to be the first record, by J. Cocks, at Bovisand, Devon, November 1847. Cocks, in a letter of 18 June 1848 to Harvey (in Herb. T. C. Dublin) requested that if Harvey again had occasion to mention the species, he should correct the mistaken date for the Bovisand find to the actual one of 21 October 1846. This was done in 1851. Clearly, even so early in the currency of the *Phycologia*, Harvey was already building a stock in the form of batches of plates involving working something like six or more months ahead in illustration, although from other sources and comments in correspondence he was a good deal less so in provision of text, often written with the appropriate plate before him. The general situation was expressed in that letter of 10 February, when he stated:

> The day is now barely long enough, till I get through my Dasya plates (6 quarto), which come on after the present batch of Phycologia (12) are turned off. This will not be for a fortnight.

Following not long after was an interesting letter to the Rev. Miles J. Berkeley; written on 5 March 1846, this gives considerable insight into finance and attitudes in this working arrangement with Lovell Reeve, and forms the prelude to a series of lengthy letters with various correspondents (although principally the Hookers) in airing aspects of the *Phycologia* about which Harvey was not then too happy. The letter commented:

> I intend to give Lenormand the Phycologia, & shall forward him the 3 first numbers tomorrow. It will be more interesting to him than to Montagne, & I cannot afford to give many copies away—seeing I pay trade price for them all. I give none in England except to Ralfs, & that for reasons which are obvious. I mean to give 4 or 5 on the Continent, but as yet have only determined on Lenormand & Meneghini.—If Biasoletto would send me plants he should have a copy,—but really those Italians are much more free of promises than of plants. Meneghini sends me his "Alg. Ital. & Dalm." so he is fairly entitled to a copy.
>
> But I must not forget my object in troubling you with this note. It is to beg, (*a la A.H.H.* ?) that you would give a few lines in Lindley's Gard. Chronicle, descriptive of the Phycologia, its plan & intentions &c and its execution. I do not want to be praised to the skies, for I am conscious of many, many defects—all I want is that the readers of the G.C. may be informed that such a Work is in progress—In other words—I have an interest, as you know, in the sale—&

> consequently wish as many to know I have goods to sell as may be. It is perhaps a little indelicate to write and ask to be noticed. You will freely take no notice of this request if you feel the slightest hesitation in this matter. I write to you because I wish, if noticed at all, to be reviewed by a competent judge—& Lindley you know knows nothing of Seaweeds.

This script, held in the Berkeley Correspondence, vol. **6**, GREV–HOO, and written as usual from Trinity College, was not Harvey's only attempt to make sure that the *Phycologia* was noticed by appropriate journals of the day; amongst other matters in a letter of 23 March 1846 to Sir William Hooker (W. J. Hooker, English Letters, vol. **24**, f. 244, 1846), Harvey requested that:

> When you find a convenient place in the Journal [Hooker's, London Journal of Botany]—perhaps you would notice the Phycologia. The April N°.—(if not spoiled in the printing or colouring) will be the best yet. All its plates are handsome.

It will be noticed that this short section of the 23 March letter betrays an increasing confidence in his own illustrative abilities on Harvey's part, as yet unmatched by a similar increase in confidence about Reeve and his various production associates/employees. The letter was written from Dublin, so that it is possible (especially in view of the alacrity of both the then postal system and the correspondents in this particular exchange) that the reply from Hooker, dated from Kew only as 'Wednesday', was actually written on Wednesday, 25 March 1846; at any rate, it was most probably written then or on the next Wednesday, 1 April 1846. William Hooker was clearly quite happy to oblige by noticing the work, but equally did not propose to 'puff' by praise unless he felt it justified. Harvey, being the man he was, would doubtless have been embarrassed by any lesser degree of frankness. Hooker wrote (Sir W. Hooker's Letters to Dr W. H. Harvey, **1832–60**, f. 179):

> I will not forget a notice of your charming book as soon as I have a little leisure. If you would give me any notes on the plan &c. you may safely leave the praise (or otherwise) to *me*: & it would be some help to me.

In Harvey's further response, dated from Dublin only as 'Sunday' and therefore probably written on 29 March or 5 April, depending on the dating of Hooker's letter, there is indication of Reeve's attempts at publicizing the work:

> The best notes I can give you on the plan &c of the Phyc. are contained in the Prospectus, & in the *Advertisement* prefixed to the first number. The cover of the next Bot. Mag. will flame with it, Reeve says.

This letter (W. J. Hooker, English Letters, vol. **24**, f. 245) presents useful confirmation that the Advertisement was actually issued with part 1 of the work.

Very soon after this, in a massively busy month for *Phycologia* correspondence, Harvey wrote (Letters to J. D. Hooker, HAR, vol. **11**, ff. 37, 38—single letter), clearly in response to a thus far untraced letter in praise of his efforts, from Hooker Jr, in some detail of his problems with the coloration of plates as published. This letter is both an excellent example of Harvey's occasionally dry humour and a firm exposition of the extent to which he looked to both the Hookers for practical help and moral support in the complexities of the production process. This letter from Harvey is dated only to Easter Evening [= April 12] of 1846:

> My dear Joseph
> . . . As to your praises of the Phycologia—they only half please me!—What! not fulsome enough for my palate!—nay verily—but how can you overlook the abominably careless *colouring*—on which I have been lecturing Reeve, & getting others to lecture him. It pains me to look at the 4th. number, which is turned out more like a child's 6d toy book—Goody two shoes or the like—than like an "opus magnum" as it ought to be. I assure you the coloured patterns I

> sent him were very different looking things. How horribly the tetraspores are butchered—& poor Miss Hincks has not got a lick of the brush—(central figure) at all at all. Then *Brodiaei* is thoroughly spoiled through careless colouring and it *ought* to be a beauty. How do you compel Graves to obey you ?—Do you see *coloured* proofs ?—I fear Reeve is cutting him down to some very low figure at which colouring cannot be decently done. The sale is only 166 he tells me—& I suppose this does not quite pay him—& that he is screwing tight. Do help me, please. At least with advice. Pray look at the bad colouring of the last number, & next time you pass the shop—give a word in Season. You promised me "troubles" in the affair. This matter of colouring is my only trouble yet, & it is a teasing one.—If so be, that you look at *coloured* proofs of your plates before publishing;—would you have any objection to do this friendly office for me—*I* sending you a coloured pattern—*you* judging whether Graves did justice to my plate.—??—
>
> I fear to trust Reeve—he is so ignorant. And yet, it may be imposing an unpleasant office on you. If you would think it so, or if it would be too troublesome—say so frankly.
>
> Another matter. Reeve complains that the work *comes out slowly*—& wants me to publish *now & then* a double number. He does not, I suppose, relish a 5 years probation. I certainly *could* publish faster—at least the future volumes—& had he given me notice a month or two ago of his wish—I could easily have prepared more plates for the present year. But I cant lose my holidays to draw plates for him. What is yours, & Sir W$^{\underline{ms}}$, opinion on this matter. Ought I to publish these double numbers, so as to finish the book in 4 instead of 5 years. ?—
>
> . . .
>
> We ought to have letters from Gunn soon—in reply to our parcel. If he is a good boy I may send him the Phyc. by & bye. At present I pay for 5 copies to give away—all on the Continent—that is—4 Europe, & 1 America (Prof. Baillie).—

This letter, as with many that follow, is also expressive of yet another general attitude reflected in the years of correspondence on *Phycologia Britannica* between Harvey and the Hookers. Justified or not, the textually abusive treatment of Lovell Reeve, who only a little earlier than the years of *Phycologia Britannica* had also been responsible for the publication of the *Flora Antarctica* (*The Botany of the Antarctic Voyage of H.M. Discovery Ships* Erebus *and* Terror), by the triumvirate emphasizes rather astonishing overt swings in attitude to Reeve throughout the present correspondence period. It is not clear to what extent the abuse was ever directly verbally presented to Reeve, although from some of Joseph Hooker's letters it likely was so on occasions.

One such occasion is outlined in another April 1846 missive from Harvey to Joseph Hooker (Letters to J. D. Hooker, HAR, vol. **11**, ff. 39, 40—single letter), written from Trinity College some 10 days after the letter of Easter Evening and in response to a further letter from Hooker that had lain in Harvey's Dublin premises awaiting the latter's return from a week or so away. This follow-up letter is also worth quoting at some length, since it establishes the atmosphere of negotiations and tensions; it demonstrates the continuing thorny problems, arising throughout much of the early currency of *Phycologia Britannica*, in matters of coloration, its desirability, efficacy, costing and organization. Even as early as October 1845 this was identifiable as one of the principal contentious subjects in the development of this publication (see above). Harvey penned the letter concerned on the day of his return to Trinity College, 22 April 1846, saying to Joseph Hooker:

> . . . thank you for your energy in my cause in various ways. First for your attack on Reeve—whom you know so well how to manage. I have a new letter from him today—in which he goes back in spirit from the singular "peccavi" humility of his former letter—and assures me that when he undertook the work he did not

> anticipate that the colouring would be more than a little touching up at most, & broad washes to a few. Instead of which he finds that all require a full colouring. In reply I have admitted that I did not anticipate such heavy colouring, which is partly necessitated (I tell him) by the bad colour of his printing inks—but I remind him that he has *in his prospectus* appealed to the seaweed plates of the Antarctic Flora, & promised that those of the Phycologia shall be "coloured with equal care." I tell him therefore that I think is he bound to colour *as well* as these;—but not *better*; & therefore that if I require my plates to be more expensively coloured I ought to bear a part (at least) of the expence. [*sic*] This would appear to me but fair—and I have suggested to him to leave the matter to your Father to decide. I am quite satisfied to do as he shall direct. I had far rather have the work *well put out* than pocket money by it. Reeve should be made to show that he allows as much in proportion, for the colouring of the plates as he paid for the Antarctic. If that be not sufficient for my plates—and a fair sample of the whole work is now before the colourer—I am willing to make up either the whole difference, or such part of it as your Father thinks just & reasonable. But in the event of my having to pay, I would avail myself of your kindness in looking over the work. Otherwise perhaps I have no right to put that curb on Reeve,—at least only by his sufferance.
>
> I shall be glad to hear what Graves says in reply to your letter.
>
> I have consulted sundry persons about the faster publication & their advice pretty nearly agrees with yours. Thompson suggests that if I could finish up the first vol. at once, & issue it, at the option of subscribers, either as a Vol., or in monthly regular 2/6 parts—many would press for the former, & the poorer sort be accommodated with the latter. This I *may* possibly do—*AFTER vacation*. Catch me cheating myself of my holidays. Nay, nay.—. . .
>
> Gunn has written me a nice letter, acknowledging the parcel—which he says pleased him, & promising a great harvest of Algae on his visit to the sea—which was "about to be".—I mean therefore to send him the Phycologia, in your next parcel.

The letters of 12 April and 22 April detailed above are typical of the *Phycologia Britannica* subject matter in correspondence during this crowded late April–early May period of 1846. Impact created by the early parts of the work was still fresh and important to the correspondents, outstandingly so to Harvey and his more immediate circle involving the Hookers, Lovell Reeve, Miles Berkeley, Amelia Griffiths, John Ralfs and a host of others. Although Harvey neither confided in such detail nor asked advice to the same degree and frequency of others as he did with the Hookers, he kept most of his more customary correspondents abreast of the general trend of events. During this crowded April/May period, for example, he requested of Miles Berkeley (see Price, 1984) specific information on the fructification of the brown seaweed *Cladostephus verticillatus*, indicating in doing so that he had figured it for the June number of the *Phycologia*. Since Meneghini's (*Alg. Ital.*) interpretation of certain structures differed from those accepted by Harvey and Mrs Griffiths, Berkeley was asked as arbiter (25 April 1846; Berkeley Correspondence, vol. **6**, GREV–HOO):

> . . . What say you ?—I must write my description immediately, & will feel obliged by your examining the matter, and authorising me to give *your* opinion, whatever it be. . . . I have been scolding Reeve about the bad colouring of the last [April] number—which is really shameful.

Clearly, the 'Goody two shoes' issue (see the letter of 12 April, to JDH) had deeply affected Harvey. In the subsequent letter of 22 April, again to JDH, Harvey had mentioned inviting Reeve, in response to a letter from the latter complaining about the extent and cost of coloration, to leave the matter to W. J. Hooker for decision. The receipt, presumably on

Saturday, 25 April, of a further note from Reeve following *his* receipt of the 'patterns' for the June number and in agreement with submission of the matter for W. J. Hooker's arbitration, prompted Harvey to write on 'Sunday' [which must in this case mean 26 April 1846] to 'My dear Umpire'. Although the manner of writing clearly indicates that the 'Umpire' in this missive meant J. D. Hooker, Harvey would have been fully aware that generally shared interests, shared friends, shared colleagues and close familial relationships would have meant rapid cross-communication between Hooker Senior and Hooker Junior about such matters of common interest. This letter of 26 April is of importance since it also enclosed a full transcript of the note to Harvey from Lovell Reeve. Harvey himself wrote (Letters to J. D. Hooker, vol. **11**, f. 41):

> I think it well to send you annexed a copy of a note which I have just received from the Enemy. I confess the sin that there is [*sic*] one or two awful plates for June—and fear I am in a fix. We have priced the work too low—and I know not how the difficulty is to be met.
>
> Reeve should be made to show that he allows a *fair sum* for colouring, keeping him to his bargain that the Colouring shall be equal to that of the Antarctic Flora. If that point can be SECURED—I will gladly let him off of the prospective £360, and be contented with the £1/plate in hand.—I would rather sacrifice this sum, or indeed the whole £720, *minus a few copies to give away, which I now pay for & say ten* or twelve *copies*—than injure or obstruct the Book. I shall be quite contented to be borne *free of loss* if driven to such hard terms. I cannot afford to be *out* of pocket;—but must be resigned to make no profit if need be. I am sure however that Sir W^m^. & you will make a much better fight for me than I can myself—& I give you full power—I shall not say more to Reeve, except through you.

The note to Harvey from Reeve, written on 24 April from King William St., Strand, was copied *verbatim* by Harvey and stated:

> I write to thank you for the June patterns; the colouring is quite alarming; I have submitted the case to Sir W^m^. Hooker agreable [*sic*] to your request; and regret that I am unable to answer your letter more fully, as I intended to do, in consequence of Dr. Hooker who has promised to write to you, having run away with it.
>
> I have compared the May plates with the patterns & have been obliged to send five out of the six for more work to be put in, at an advance of price; and at which advance they decline to proceed further.

The crowded nature of this period of *Phycologia* correspondence inevitably led to much crossing of letters in the post. One such event caused Harvey to write yet again to Joseph Hooker on Monday, 27 April, even though he had sent the above on that same day, having penned it on Sunday, 26 April. The need for a second missive arose from the receipt on that Monday of Joseph Hooker's letter written on 24 April. This chain reaction also instigated W. J. Hooker's writing to Harvey on consecutive days in that April period (28 and 29), as will emerge shortly. Harvey's letter of 27 April was wholly concerned with aspects of the *Phycologia* (Letters to J. D. Hooker, vol. **11**, f. 42):

> My dear Joseph
>
> I have your letter of the 24th & wish I had half your common sense in my skull. Happy for me you allow me the use of it at times—& I am really thankful to you for your help on the present emergency. I quite agree with your advice—& have written to Reeve to that effect—Read the enclosed letter, and when you go to town give it to him with the three patterns.—I have endeavoured to write him "soft sander"—and really mean in future to give him no cause of complaint—except he complain of my using up too much of his *chalk*.—As to *Gunn*—I have

> frequently begged him to have it put on, but he has always declined—by which I suppose it is expensive. The spores would doubtless look much better with it.
>
> The upper figure in Pl. 41—(for your information) is intended to represent a scabby piece of decayed dillisk. The lower (B) is Ceramium rubrum in the small box.

Whatever the advice (see below) J. D. Hooker gave Harvey (the letter of 24 April to which the above was the reply has not so far been traced), it met with the approval of both Harvey himself, as indicated, and W. J. Hooker, whom the letter of 26 April (from Harvey) with a copy of the note of 24 April (from Reeve to Harvey) inspired now to reply at some length; it is a considerable tribute to the postal services of the time that the sequence of exchanges between London and Dublin was so prompt. It should be emphasized here that one unusual habit of W. J. Hooker's is responsible for the possibility of now quoting easily from the *actual letter* written by W.J.H. to Harvey at the time, not from a transcript or copy of the letter, nor even from the (if any) first draft. This is once again the habit mentioned elsewhere in the present study—that of retrieval from accessible sources (e.g., relatives or sufficiently close friends of the Hooker family *sensu lato*) of actual letters written by Hooker Senior, for subsequent incorporation into the voluminous record files the Hookers maintained.

Advice from J. D. Hooker is probably rather accurately mirrored in the content of the letters his father now wrote (28/29 April) to Harvey: indeed, Hooker Senior virtually says as much in the later of the two missives. The earlier letter (Sir W. Hooker's Letters to Dr. W. H. Harvey, **1832–1860**, ff. 181/182) of 28 April opened cautiously:

> I really hardly know how to advise you in the matter between you & M^{r} Reeve. If you *must* make your plates so much more laborious than you did at the commencement it is not fair that Reeve sh^{d} have to pay so much *extra* for colouring. But can you not without detracting from the usefulness of the book, & from its scientific character, bring down your subjects to what they were in the specimen plates. I should be *very* sorry that you sacrificed *one farthing* to *Lovell Reeve* of your £720. Give him one inch & he will take an Ell.—& pray do not be bullied into it. You will not easily get him to say what he gives to a colourist:—but when you come here, as I hope you will do soon, we can see Graves & arrange if anything can be done between him & you, if you must make a Sacrifice. Better still to keep to your original pattern. As far as I can see, your first 4 N^{os}. (all I have seen [)] are pretty uniform:—but Joseph says the 5*th* No. is *much more* full of work. This you should avoid & tell Reeve you will in future:—& I really think your plates will be prettier when they are less crowded. I have before me plate IX, & I think that plate would be better & quite as useful without fig. 3. In Plate XIV. f. 5 shows nothing more than what I see in f. 2—one half of f.7, of fig.4 & one 6*th* of f. 6 would show as much that is needful as your present analyses. Again could you not give 4 greens or 4 reds on one folio stone ? & save Reeves [*sic*] some trouble there ? Once go beyond your agreement, in even so slight a degree. & you are at Reeve's mercy. Give him a few capillary subjects & less analyses in the broad species, w^{h} I suppose *must* be colored by hand. Small & numerous figures are the horrer [*sic*] of colorists. Take Plate XX;—is f. 8 necessary ?—less of 6. would suffice, as would less of f. 2 & one third of f.f. 4. & 7. In Tab. XIX, too, some figs. might be omitted without detriment to this plate.
>
> Indeed you give good measure in all your plates, & no one could object if you have not to pay too dearly for so doing. Let me beg of you therefore to *pacify* Reeve by a promise of reducing the work on at least such parts as require coloring.

Criticism of aspects of the *Phycologia* this letter and the following do most certainly involve, but in all cases the attempt is constructive and worthy of serious consideration by Harvey.

Hooker himself referred to the second letter as a 'note', but it is hardly less long than the letter of 28 April, to which it is effectively an addendum based on receipt of the three patterns and letter for transmission on to Reeve that accompanied Harvey's letter of 27 April, this reaching the Hooker household on 29 April. This note was:

> merely to say that I think your letter to Reeve's [*sic*] is exactly what it ought to be: & it would seem that, without my knowing it, Joseph has been giving you exactly the same advice as I did yesterday:—& when Father & Son agree, it may be hoped the suggestion is good.
>
> Excuse me now if I criticize a little. the 3 plates now sent:—I do so solely on the ground that you give too much work for the Colourist to suit M^{r} Reeve's pocket. You do so sometimes unwittingly I believe. In Tab. XXXIX w^{h} I suppose has to be coloured by hand, indeed it will not look well otherwise,—I would observe that to follow that puckered outline will occasion twice as much work to the colorist as if that outline was quite even. Query, is it *always* so puckered ? Again 2 fronds instead of four,—the 2 left hands placed in the centre of the plate,—would answer all the purpose of your four, & the plate would look better. There here is I think twice as much work, *at least*, as is necessary.
>
> Tab. XXXVII. is a very heavy plate, perhaps however not intended for colouring. If it were & if only one color were used there is much work in f. 4—f. 1 does not look to me the color of this plant & the tone of color is the same throughout.
>
> Tab. XLI. Here you have 2 species on one plate. A is a parasite growing on a Fucus. Now all those laciniae of the Fucus give a great deal of work in the coloring & if they were cut off handsomely & f. 3, 4 & 5 reduced one half, the plate would have been better, & would have balanced the figs. in B better. (Sir W. Hooker's Letters to W. H. Harvey, **1832–60**, f. 212.)

It is worth mentioning here that these letters with constructive criticism were in no way apparently taken amiss by Harvey, as will become clear from consultation of the text of his letter of 5 May to W. J. Hooker (see below). Before then, however, the flood of late April letters crossing the Irish Sea had not yet been completely exhausted. Joseph Hooker had obviously written extensively, following receipt of Harvey's letter to him of 27 April (see above), to the latter with criticisms of similar import to those of his father. Harvey then also replied at some (but not quite equal) length and felt constrained in his letter, dated 30 April 1846, to set the record straight as he saw it on one apparently vital issue. So doing, he opened (Letters to J. D. Hooker, vol. **11**, ff. 43, 44 [single letter]):

> I have your letter of three sheets today, & thank you heartily for it—but before we proceed further let me beg leave to remark on one expression—you say "There is another great difficulty with your work that Reeve did not bargain for—You put a green, a red, & perhaps a third or fourth colour upon your stone of 4 plates, & he has an extremely difficult task & most expensive one in consequence."—Now give me leave to say, in the gentlest manner possible to your informant that this assertion is a "REEVE"—let that be a new noun for a double edged [word illegible]. The TRUTH is—I did put *2* colours on the two stones which I finished at Kew—for the purpose of securing variety in the first number:—but on *all* the stones I have drawn since I came home—I have INVARIABLY put but one colour on each stone of four plates. If therefore Reeve complained to you of my "practice" in this respect—he was humbugging you. Let him show the stones, say I. But I trust you will believe me. I have drawn 45 plates for him; only 4 of these were in quarto—pairs of 2 colours—so that *41* were drawn separately.—Take care that he is telling us truth about the colourer.
>
> I was thinking that perhaps Pl. 34 would do to be partially coloured; say, to colour the main stem & one or two branches, & to leave the rest in outline. If

> you think so, you can let Reeve off with it thus. If not, let him flounder about a little longer. He deserves to be in a mess for having told "Reeves", for effect.—
>
> I have not written to him anything about the colouring of the June number—not wishing to interfere with what you may say to him, after receiving my letter of Monday last.—

Aside from the obvious importance in other directions, it is interesting to note that this letter gives a measure of the extent to which Harvey was already, even in the early stages of the work, preparing ahead of matters. Harvey had at this time drawn 45 plates; that is, he was half way through the plates required for part 8 at a time when in publication terms the work was in the month between parts 4 and 5. Plate 34, very precisely referred to in the letter, appeared in part 6 (June, 1846); it figured the red alga *Odonthalia dentata*. Harvey's suggestion that [in fig. 1] the main axis and one or two branches alone should be appropriately coloured, leaving the rest of the gross plant merely in outline, was not followed; the whole of fig. 1 is coloured. However, his suggestion was not wholly neglected since the majority of the other figures (2–9 inclusive) show either no coloration of any kind or a minor amount for contrast purposes. Figure 8 (tetraspores) is the only one to show full colour, whilst 3, 4, 6 and 7 have only the actual spores coloured in. The reference in the last paragraph of the letter to Harvey's letter 'of Monday last.' concerns that which he wrote to Joseph Hooker and dated 27 April.

The letter from Harvey to W. J. Hooker, of 5 May 1846, exemplifies the former's ready acceptance (referred to above) of legitimate constructive criticism. It also shows in its reference to the two letters (28 and 29 April) from W. J. Hooker that the vagaries of the postal services were even then not above reversing the order of receipt compared to that of sending: 'Thank you much for your two letters, the last written of which arrived first.' In the rest of the letter (W. J. Hooker, English Letters, vol. **24**, f. 246, 1846), apart from general acceptance of the plate criticisms made, Harvey also reiterated the rejection of Reeve's complaint about more than a single colour on individual stones (*cf.* the letter to Joseph Hooker, 30 April):

> Your criticisms on my plates are very just—& shall be carefully borne in mind in my future work, when it shall be my special study to save as much labour to the colourer as doing justice to the subject will admit of. I know I have an insatiable fancy for crowding as much as possible into a plate—thereby giving myself a great deal of needless trouble. This shall be corrected, & I shall also give fewer small dissections, & only such as are *necessary* to illustrate the species. The plates that I am now drawing are all filiform things, & will require very little colour.
>
> *One* of them I fear you will cry out at, as there are no less than *seven* (!!!) figures of the natural size!—seven bunches, not of greens—but of reds. This over-load is however, Gelidium corneum, a plant so variable that a folio has been filled with it in Hist. Fuc.—and certainly none of my seven figures are at all similar.
>
> Reeves [*sic*] has been romancing when he told you I was in the habit of putting different colours on the same plate. The *only* cases in which I have done so occured [*sic*] at Kew; the *two first* plates that I worked on!—He made complaint at the time—But neither did I repeat the offence. Do not mind *all* he says therefore about the great additional trouble of the last numbers. The very first plate in the book is as difficult to colour as most of the others—& so is Plate XV, which passed without remark.
>
> He has not yet written to me in reply to my letter.—

Thus, the general picture that emerges from exchanges at this time is one of adjustment of ideas in the direction of practicality from idealism, consequent on increasing experience of the techniques, information, personalities and working patterns involved.

Although mostly preparation of the accompanying text was not so time-consuming as that of the plates and could therefore rest until rather nearer the proposed publication dates of particular parts, Harvey did not generally indulge in brinkmanship there either. On 11 May 1846, he wrote to Berkeley (Berkeley Correspondence, vol. **6**, GREV to HOO) requesting details of synonymy for *Rivularia Leclancherii* of Chauvin and *Chylocladia reflexa* Lenormand (*Chondria reflexa* of Chauvin), since he had not been able to obtain Chauvin's publications '& both these plants come into my July number, for which I am now preparing the MSS.—'. The same letter established that two of the free copies that he dispensed in Europe went to Kützing and Lenormand; from the former, he received the parts of *Tabulae Phycologicae* . . ., and from both he received (or at least was sent) specimens of algae. At this stage, monthly parts must be presumed to have been reaching people not too distant from London, even though well into the provinces, relatively quickly; coaching and/or train services would certainly have permitted that to some areas. Thus, Harvey, in this letter to Berkeley, felt that already (it was only 11 May) there was point in commenting on and soliciting an opinion from Berkeley about, the May issue of *Phycologia*:

> I hope you like the May number. The colouring is decidedly improved, & Reeve promises that it shall be well looked to in future. We must try & keep him up to his promises.

Harvey's 11 May 1846 letter to Berkeley is of very considerable importance for a rather different reason. Although it is clear from subsequent correspondence that Harvey had discussed the matter previously with Joseph Hooker, perhaps face-to-face during one of the visits to the Hooker home at West Park, Kew, this letter appears to represent the first clear mention of a proposed work that was eventually to replace the *Phycologia* as the principal algal concern in Harvey's mind. This did not, of course, occur until the progress of *Phycologia* made it almost wholly a routine matter. Harvey commented to Berkeley:

> I have thoughts of a "Centuria Algarum Maris Australioris"—same size as Phyc.—to be completed in 4 quarterly parts, each of 25 plates. I have plenty of good materials from V.D.L. and C.B.S.—not to speak of the Antarctics. If I see a prospect of 50 copies being sold, I shall go on with it.

This represents the framework of the early form of thoughts about that which finally (but never completedly) appeared as the *Nereis Australis* (1847–1849), subsequently building into *Phycologia Australica* (1858–1863).

Over this early May period, Hooker Jr had been looking on Harvey's behalf into the financial background of colouring of plates in these works. In his letter to Harvey of 28 April (see above), W. J. Hooker had already cautioned that it would not be easy to get Reeve himself to admit what he paid a colourist; W.J. had then suggested a discussion direct with Graves (the colourist well known to the Hookers and often employed by them, as well as by Reeve in works of this type) about the problems and costs. Doubtless father and son had in their various spheres carried this further, presumably in Joseph's case concluding that there being no immediate likelihood of a Kew visit by Harvey, it would be advisable to forward the matter by their intermediary discussion and letter from the colourist. Joseph Hooker was obviously on the move at this time, since Harvey's letter of 12 May 1846 (Letters to J. D. Hooker, vol. **11**, f. 45) from Dublin to him opens:

> I hardly know where this will catch you, but if it miss it is not of much consequence.
>
> Thank you for Graves's letter, and your comment upon it. We have established at least one thing—that R. allowed *shamefully* little for the colouring, & he is now quite excluded from my pity. Money he shall have none from me—but I *will* condescend to give him less work—& then, if he again transgress, I will raise a hundred tongues to snap at him. I think there can be no harm in letting him know that *some* have discontinued the work from disgust at the colouring.—

> Had I not the advantage of your letter giving me an insight into the true nature of the case I should have been inclined to pat R. on the back—having had a most *frank* (seemingly) & *affectionate* letter from him yesterday—& his having declared his willingness to pay "twice as much for the colouring as he had formerly planned."—You would not, by his words, suppose that the magnanimous resolve was *not* to make two bites of a cherry.
>
> The May number is certainly the best number yet *in colouring*—& he promises that June shall be a facsimile of the patterns.—I hope you gave him the 3 July patterns I sent you.—Reeve (kind man) "hopes I will not make the plates *too reduced*," as he "likes as full a plate as he can get for the price."—(!!!)—always provided he has not to pay for it.—

The later paragraphs of this same letter included further written reference to the proposed work on southern algae, with which Harvey had regaled Berkeley. The letter from Graves, apart from establishing Reeve's niggardliness in Harvey's mind, had clearly pleased him in regard to the possibility of having coloured plates for the new work:

> I am glad to hear Graves speak of 6/– or 7/– as being a *fair* price for *good* colouring. If it could be done for this I should be tempted to colour the "Century". It would be a great thing if but *50* copies could be coloured in a batch—as I fear not more than that number will sell.—. . .

Harvey obviously still thought Joseph Hooker to be away from Kew on 15 May, when his next long missive was written on the subject of the new project, and he therefore addressed his usual extended thoughts on the matter to W. J. Hooker (English Letters, vol. **24**, f. 247, 1846):

> As Joseph is from home, & I know not how long he may be absent, I write to you on the subject of the "Century of Algae", the plan of which we have arranged between us. He has probably told you all about it.
>
> I wrote to Reeve to know the expense of getting up a Vol. of 100 plates & letterpress—and he writes me in reply—"I have been calculating whether we could make you any offer to publish it at our own risk; but find we could not undertake it unless you would guarantee a sale of 75 copies within a given period, say a twelvemonth from the completion; that is, that if at the end of a twelvemonth we had only sold 65 copies, that you would then take 10. If we had anything to do with the publishing, it must be coloured by hand, and well advertised on all our Wrappers. I think moreover it would be much better to bring the work out complete £3. 3. 0.—not in parts."—xx "as I said before, if you would like to guarantee us 75 copies at the trade price £2. 7. 3, we would undertake to produce the Book in first rate style."—So far is Lovell's offer which is an odd one enough—as it may be translated—"Give us all the profits, & you are welcome to the losses."—Of course I could enter into no *guarantee* of the kind, but as I should be very glad to get the work published, not only without any *profit*—but even at a *moderate loss*;—and as I think that Reeve, by proposing terms of any kind, shows a *wish* to take the Book—if you will afford me your kind advice and assistance as Ambassador between "the high contracting parties", I am not without hope that a *reasonable* bargain may be struck. A *great object* with me in publishing it is, to *give away* a certain number of copies to persons in the South, like Gunn, by whom I hope to be paid with plants in return. For this purpose I am willing to sacrifice £50—that is, to take from Reeve *25* copies at *2/3 price* or £2.—*As Author*, I ought to have this little advantage over the trade. It is evident from his offer that the sale of 75 copies would repay him. I therefore take *one third* of his risk, & am willing to undertake not to give away more than 5 of these in Europe—if he require the condition. It is for him to consider whether he could sell the remaining 50. *I* think he could.—The book will be a very handsome one, the subject being quite

> equal or superior to those of Phyc. Brit., and my hand being a little more practised to the manipulation than when I undertook that Work. I enclose you a projected *Title & plan*. In the letter press I mean to introduce a good deal of illustrative matter, & synoptic tables of the species of several genera—as Joseph has done in Fl. Antarc.—all which will make the work more valuable, both to the Australian & the European purchasers.—
>
> I have mentioned the *Herbarium* on the title page, because I want to connect the book with the Herbarium, & mean to give a *begging preface*, with a notice of what we have been doing. I hope you like my *motto*, which I trust is not hackneyed, & which is very suitable to the atmosphere I live in—where I have the name of being a "*wild enthusiast.*"!
>
> Reeve has not had the book *formally* laid before him—The enclosed plan might therefore be sent to him.—if you approve of it—and he be informed of my willingness to take 25 copies. A *prospectus* stating that "if 50 copies be subscribed for"—the work would proceed—might bring in that number.—If possible, a *share* in any future profits, (though I fear they would not amount to much) might be stipulated for. But I am quite willing to waive this point. And now I ought to apologise for asking you to undertake this troublesome affair—only that all apology would come with a bad grace,—and so, I must leave it to your good nature to pardon me. You made such a capital bargain for me before that I feel confidently you can pull me through now much better than I could myself.—& I have too often proved your friendship to doubt your willingness to help me over the difficulty. And so, my dear friend, I must leave it in your hands, to do or not to do as you shall think proper. If the thing were settled, I should begin to draw immediately, as in a week I shall have the Phycologia to *November* & half December completed.—

This letter demonstrates very clearly the approaching routine status of the progression of *Phycologia Britannica* and the extent to which the southern algal project was now Harvey's prime concern. It is interesting that, however much there was cause (or at least seen by Harvey and the Hookers to be so) for complaint as to the way Reeve had conducted certain aspects of the publication of the *Phycologia Britannica*, there seems to have been little or no hesitation in deciding to approach the same publisher in connection with this new venture. Better the Devil you know . . .! In these so similar circumstances, of course, the Hookers were again clearly going to constitute the primary mediators between author and publisher.

However much this was accepted by both, Joseph Hooker at least felt he had first to clear up one matter that was troubling him. The letter expressing this has not so far been traced, but from Harvey's letter of 22 May in reply, Joseph having by this time presumably returned to Kew, the nature of the matter is abundantly clear. (Letters to J. D. Hooker, vol. **11**, ff. 46, 47; single letter). Joseph was, perhaps understandably, disturbed as to the mutual interference likely in content and sales between the new southern project (Harvey) and the southern algae portions of the *Erebus* and *Terror* voyages in which he (Hooker) took part and would author/edit. Harvey's response was understanding but firm: 'When first I contemplated a book on the seaweeds of the South, I never for a moment supposed that it would interfere with your Flora—no more than the Phyc. Brit. does with the British Flora.' The remainder of that letter has much content concerned with the *Phycologia Britannica*, in that Harvey (explaining his objectives in proposing to treat the southern algae) pointed to the fact that the Board of his College Herbarium were applauding the *Phycologia* since they '. . . like to see such books coming out of their Walls.' Harvey aimed to obtain 'plenty of southern seaweeds' by rousing via the project 'all Alumni who may have been transported for breaking portland vases or the like to work for our Herb.' The latter allusion is interesting—it refers to the smashing in 1845 of the Roman cameo glass 'Barberini' [= Portland] vase. Found first in a marble sarcophagus at Monte del Grano (near Rome) in the mid-seventeenth century, this vase was placed in the palace of the Barberini family before being sold for 1000 guineas to Sir William Hamilton in

1748. Bought eventually (1785, for 1800 guineas) by the Duchess of Portland, it was lent in 1810 to the British Museum and was completely shattered, by a vandal (William Lloyd), whilst it was on display on 7 February 1845. Very skilfully reconstructed from existing Wedgwood jasperware copies, it was then restored and finally bought by the Museum in 1945. Last rebuilt in 1949, the vase requires further breaking and reconstruction since the adhesive employed has become brittle and discoloured. Reconstruction, about to be undertaken (*Independent*, 2 June 1988), will employ epoxy resin which should last for 200 years.

The letter to Joseph Hooker of 22 May also contained passing reference to a review of the *Phycologia* in *Revue Botanique* (see Appendix III, 4). Asking for details of this latter journal, then unknown to him, Harvey wryly added: 'I am a little curious to see what they say of us. Lenormand writes me a most flattering rigmarole,—but so he ought, as he gets the book free.' Further of interest here, the letter indicated Harvey's firm hope to be in London in September, '. . . if you will then be at home'. Lithography, finally, played a great part in Harvey's life at this period; the terminal comment referred to specimens, received from Joseph Hooker, which had not yet been looked at—Harvey '. . . Being particularly busy this week finishing up a box of stones . . .'.

Weight of commitment was not simply Harvey's problem. In a letter dated only to 'Kew. Friday Eve', William Hooker wrote to Harvey regarding the latter's proposed arrangements with Lovell Reeve for the work on southern algae. 'Friday Evening' could here indicate either 22 May 1846 or, more likely, 29 May; Harvey's letter setting out the matter was written on 15 May from Ireland and date-stamped 16 and 18 May. Amongst the impressive list of involvements with which the letter opened, Hooker listed journeys to Hampshire to join his family, his wife recuperating there at this time. These involvements meant that (Sir W. Hooker's Letters to Dr. W. H. Harvey, **1832–60**, f. 183):

> I have scarcely had time to consider your proposed arrangement with Mr. Reeve. And now that I have as I think carefully read the letters it does seem to me that Reeve's proposition is more advantageous to you than your own. That is, if I understand it correctly, you propose to insure him a sale of *25* copies, or, in other words, to take that number yourself, while he says "you are to take *10* copies, *if at the end of the year* the number of sold shall be *only 65*." Now, seeing you are to gain nothing, had you not better bind yourself to take 10 rather than 25 copies ?—& then if you want to *give away* more, for that is your way of doing *business*, you can always take more, & always no doubt at 2/3 price;—at least I would *make* him do that. Do not yield too much to him, for it is a bad precedent, & I think it is easy to see he w$^{\underline{d}}$. like to publish the work. All you have to do is to drive him as hard as you can, & make as little sacrifice as you can. Never fear about his making a bad bargain for himself; he is not one of that *destiny*. I would not if I were you show myself too eager about the thing. If you like I will call & speak to him on your behalf, unless you think of coming yourself. Your title is good & your motto quite unobjectionable. You will get lots of Algae by your liberality if you give cautiously. I would rather, if I were you, look to be freed from loss than for any future profit:—you will never get that:—the sale will not be like the Brit. Algae:—but the Brit. Algae will aid the sale of that.

Thus, with this proposed new work the usual pattern of Hooker/Harvey detailed interchange was maintained, as was the pattern of intercession with Reeve by the Hookers. The usual 'bad business-man' image allotted to Reeve persisted and the impossibility even in those days of profiting from scientific publications was reiterated. The letter emphasizes the extent to which the works went in tandem to a degree deeper than simply overlap in currency and planning. The interaction of earlier (*Phyc. Brit.*) on later (*Nereis Australis*) involved profiting from experience of essentially the same illustrative mode approached in very similar manner, and Hooker outlined clearly the potential for sales stimulus on the work of then more restricted interest (*Nereis*) by that of more immediate interest for the then major phycological market (G.B. and Europe).

By the standards of that period some slight pause now ensued in the Hookers/Harvey correspondence saga. The circumstances behind the events of early June 1846 were explained in letters Harvey wrote on Saturday, 6 June, whilst at sea in the yacht *Charm*, and posted during a call at Campbeltown (Kintyre, Scotland) to pick up a Western Isles Pilot. To N. B. Ward, in U.S.A., he wrote (Fisher, 1869: 154):

> Here I am, very much to my own surprise, and probably as much to yours. The day before yesterday, at two o'clock P.M., a friend [T.P.] called on me and offered me a trip in his yacht to the Western Islands, Shetlands, and possibly Iceland or Norway, weather permitting, if I could be ready to start at six that evening. I had much to do; first to prepare the July copy of the "Phycologia", then to ask liberty from the Board, then to pack up. The offer was so tempting that I made the push. We sailed at seven that evening. . .

To W. J. Hooker, Harvey was at the same time both less and more specific, the latter particularly as regards *Phycologia Britannica*. Details of the comments he then made reveal clearly the high regard that he held for Mrs Amelia Griffiths of Torquay (W. J. Hooker, English Letters, vol. **24**, f. 248):

> Our course from this will be through the Sound of Ilay [*sic*], but after that our plans are not fixed. We mean *at least* to visit the Western Islands & the Shetlands, if the weather be favourable, & *then* to make up our minds whether to stand westward for Iceland, or Eastwards for Norway—or (if we have got enough of it) southward for home. I am ready for any of the three, liking them in the order in which I have named them. *Iceland* was named before we left Dublin, but I now find we have no chart on board, except the maps in your travels—but we have a chart for Norway—so there is more probability of that. The weather is delicious—only not quite breeze enough. I never saw tropical seas more comfortably smooth, & brilliant.
>
> I left Dublin in such a hurry—having only just time to pack up a few things—having to write up 4 descriptions for Reeve—that I am wretchedly provided with paper. I have only half a ream. This will do for the rarer plants, if we only go to the Western Islands—& I shall bring the Algae, except the very perishable ones, home in the lump. If I can I will get more in Campbeltown. The next port will, I suppose, be Tobermory.
>
> Our yacht is a fine one of 40 tons—and very comfortably fitted up. I should not mind making a much longer trip in her. There are *five* of us in the party, and we have *four* sailors. I cannot say that pulling the ropes is the most delightful of occupations to unused hands, but as yet we have had little of it. We all lend a hand.
>
> I send off to Reeve by this post the Copy for August & September—and as I have requested Mrs. Griffiths to oversee the colouring of the patterns—I hope the *Phyc.* will not suffer by my gadding. I have begged her, should she find it too troublesome, to send them to you—that Fitch might colour them—but as Mrs. Griffiths is a good colourist, I suppose she will not find any difficulty.

Routine it may already have become, but the *Phycologia Britannica* was not yet being allowed to suffer, as to some extent it subsequently did, from some of Harvey's longer foreign trips (when it temporarily lapsed to one issue every two or so months), during the 'Gadding' of 1846. Dispatch of the August and September text copy to Reeve on 6 June indicates a strong attempt to maintain sequence.

In the event, Harvey need not have preoccupied himself with these matters; this is demonstrated by a letter to N. B. Ward, written still from R.Y. *Charm*, but this time from off Caithness, a good deal further north, on Thursday, 18 June (Fisher, 1869: 155):

> Alack-a-day! my nobles* have come to ninepence, and instead of a three months' cruise, embracing Iceland and the Shetlands, we are now on our homeword course, having merely "marked off" the Hebrides and Orkneys. In so hurried a trip I have had few opportunities of botanizing, indeed have been but little on shore. We go down the east coast of Scotland, and intend to take the yacht through the Leith Canal to the Clyde, then probably to stand over to the Giant's Causeway, where I mean to land, and hope to reach Dublin by June 30th. As my northern tour is frustrated, I shall then be quite open to the projected Irish tour, and need not repeat what pleasure it will give me if you make party with me in it.

Harvey at the same time presumably communicated this breakdown in plans direct to W. J. Hooker, for the latter, in a letter dated only to 'Kew. Tuesday Eve.' (which from the information in the 18 June letter to Ward must have been that of 30 June of 1846) wrote to Dublin that (Sir W. Hooker's Letters to Dr. W. H. Harvey, **1832–60**, f. 213):

> You will be in Dublin I suppose by the time this reaches that place, & you will neither have seen Norway nor Iceland. I do not know what people keep Yachts for if it be not to go & see interesting places. However you have had a holiday & no doubt a pleasant excursion & I felicitate you upon it.

From general references in correspondence at about this time, it is clear that the *Phycologia* was not, for whatever reasons, receiving as much publicity as many, including Harvey himself, felt to be just and appropriate. Perhaps one of the most likely reasons for this is suggested in a letter, some years later (14 February 1849), written by Lovell Reeve to Milliken in Dubln (Lovell Reeve Letter Book (Drafts), **1847–1872**, ff. 56–57); however, see for a rather different viewpoint, the situation explained in Appendix IV(3). It seems that Lovell Reeve's letter to Milliken stated:

> Respecting advertisements, we advertise so little ourselves in the daily papers that we are unwilling to expend more than sufficient just to introduce our works in connexion with your house, say to the extent of about two pounds, which with the like sum on your part, would furnish sixteen 5/– insertions.

More specifically on the point of *Phycologia*, much the same message emerges from the earlier letter, quoted more fully later, from J. D. Hooker to Harvey (7 August 1846) anent Reeve's general meanness as it affected the *Phycologia*.

> That man Reeve; every one calls him the most stingy chap in London. In less than 6 months *without advertising* he has a sale of 200 copies: what in all the world do either you or he expect ?—Do remember that it is not *Punch*. . . . Reeve wants us all to puff to save him the expense of advertising. . . . What a pretty fortune he hopes to make if a book extend to 60 parts, commences to pay before 8 are well out. Reeves [*sic*] meanness is beyond all bounds . . . A gentleman here the other day wd. have taken a 4^{to} copy of Phycologia if he had known they were to be had; but the advertisement he had never seen. . . . If Reeve had a grain of sense he would have & would still send 50 copies of No. 1 of your book to as many good book-buying families & ask them to subscribe (with a list of subscribers names). For the future I point-blank refuse to procure a sale for a man who will not, out of the most disgusting avarice, exert himself in the regular business way. . . . Forbes . . . is equally convinced with myself that Reeve is not doing your book justice, it is indeed a common matter of discussion with us & Reeve's avarice a Proverb.

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*A 'noble' was an English gold coin of Edward III, struck from 1344, that (up to 1461) was worth (valued at) 6/8d. It was replaced in 1464–5.

Given this background, it is perhaps not surprising that Areschoug wrote from Göteborg to M. J. Berkeley (24 June 1846; Berkeley Correspondence, vol. **1**, ABB–BRO):

> Opus Harveyi mihi plane ignotum—omnia emere plane est impossible

nor that John Ralfs should enquire, also in a letter (19 June 1846; Berkeley Correspondence, vol. **10**, RAL–THW):

> How is it that the Annals does not review Harvey's Phycologia?

Lenormand, to whom Harvey sent presentation copies of the *Phycologia* (see the quotation, earlier, from the letter of 5 March 1846, Harvey to Berkeley), was one of the few continental workers already to be familiar with the work; he commented on 26 June 1846 to Berkeley (Berkeley Correspondence, vol. **8**, JER–MON) that:

> il[Harvey] a eu l'obligeance de m'adresser déjà les trois premiers numéros. J'en ai été enchanté. Cette publication aura le plus grand intérêt pour tous les amis de l'algologie.

The potential publicity-sales interrelationship was clearly leading to heated pen-nibs in the households of both principals in the matter. The partial quotation above from the letter of J. D. Hooker to Harvey, 7 August 1846 (Letters from J. D. Hooker, GRA–HAR, vol. **5**, ff. 231–234; single letter) was a section of Hooker's reply to Harvey's missive of 5 August (Letters to J. D. Hooker, vol. **11**, f. 50), in which latter Harvey had complained:

> I have had some disagreeable correspondence with Reeves [*sic*] but we are all straight again. He complains sadly of the expense of the Phycologia & also that the sale is so slack—still considerably under 200 copies—& that he is carrying it on *at no profit whatever*—&c. This is unfortunate. How can we promote the sale ?—Could anything be done in the puffing line at the British Association ? Advertisements are of little use—but were a man like Forbes to mention the matter among the Red Lions possibly we might get off a few copies. Do you know him well enough to talk to him about it. I feel delicate of writing—but I will ask Ball or Thompson to write—& talk. I wish that Reeves [*sic*] may make a little, not merely because we shall get on so much more agreably [*sic*]—but because the Australian affair hangs so much on his good humour. Mind you *puff* me well whenever you can!—Entre nous, the *June* number is execrable—I cant bear it in my sight—the colouring of the purple plates is totally unlike the patterns, unlike nature & certainly unlike art. July is better—& I hope there may be no more such blunders, which will ruin the book.

The letter in which Joseph Hooker cautioned Harvey that the *Phycologia* was not *Punch* (see above) continued as a response further to Harvey's 5 August missive:

> . . . persuaded old Dillwyn to take a copy [of the *Phycologia*] & perjure himself, for he made an oath once that he would not take a book in parts, & has cut my Flora Antarc. . . . I solemly [*sic*] assure you that I swear by the book whereever I go. E. Forbes is charmed with it though faults it has (thanks to Reeves). What a pretty fortune he hopes to make . . . he is frightening you. My Father at great trouble got a single 8$^{\underline{\text{vo}}}$ stone done with a *new* plant to substitute a less interesting species already sent on a double 8$^{\underline{\text{vo}}}$ stone, which was to be used on a future occasion; & what do you think he gets for his pains ?—a remonstrance from Reeve on the expense entailed by the difference of working off a single from a double stone, amounting to 10/6 at *his own* calculation, = 5/– probably at any one else's. . . . His treatment of Graves* is disgraceful, he has cut 1/8 of the Magazine plates so that poor Graves does the work as much for his own interest

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* Graves was the colourist employed by Reeve as a general rule. See earlier.

> in it as from pecuniary profit. It is Gs. daughter, poor starving thing I fear, that has taken up your colouring, Graves says that he would not take it up at all without doing it full justice & for that he must at his lowest estimate have double what is paid, Reeve had the impudence I believe to offer 1/4 ! . . . I know Forbes intimately & will talk over the subject with him with pleasure on Monday next. . . . Ask him [Reeve] what he thinks of the coloring of yr. *Tab.* XLV for your own sake do not give in one inch. & if he complains of the colorist work being too heavy, insist upon a return of what he pays & the man's name (if not Miss Graves for he constantly shifts) & we will get Estimates from several colorists in Town as to whether such pay is sufficient even for the very lightest work.
>
> I fear my dear Harvey that I do not give you much consolation in this matter, but I can see you are as troubled as I was at about the same stage of progress in my work as you are in yours & can assure you that being strict with Reeve was the only resource left me . . . Write me how you get on & what are the specific grounds of complaint, I will blow R. up with delight. I will say all the good I can of your book, but will not puff, or push, or be otherwise the tool to an unavailing man, by doing for him what his meanness prevents him from doing for himself. Whatever you do, pray do not for the sake of science, yourself & the public good let go one shilling of the profits. . . . So hold on, & if, as he may, he still complain of your having put work over & above the contract, you may hint at the possibility of your considering about paying the difference *to the colorist* & receiving receipt from him (the colorist) provided Reeve's estimate for what coloring was originally stipulated for, be sufficient.

Self-explanatory on the subject of author-publisher relationships, and a somewhat outstanding example of commerce and science not seeing eye-to-eye!

Other subjects *were* treated in correspondence between Harvey and the Hookers during this month of August 1846. Although most are not relevant here, queries and responses on the subject of algal biogeography do establish that Harvey had even thus early given some thought as to the form of the 'final' Introduction to the *Phycologia*, whilst having no intention of definitively framing it for setting and publication until very much nearer the end; he commented to J. D. Hooker (Letters to J. D. Hooker, vol. **11**, f. 51) on 27 August:

> I am hardly now prepared to strike out new *regions*—though I hope to be so before I come to the Introd. to Phyc. this time four years.

By early September of 1846, Harvey was already drawing on stone for inclusion in the December number of the *Phycologia*. On 9 September (Berkeley Correspondence, vol. **6**, GREV–HOO), he informed Berkeley that *Peyssonellia* [*sic*] *borealis* 'will be figured' in that number, and he commented that specimens of *Codium amphibium* Berkeley had sent were 'much finer than the specimens from which I figured.' On the same date (letter to W. J. Hooker; English Letters, vol. **24**, f. 251), he was indicating he would have to turn down a few days' fishing on the Bristol Channel, to which Joseph Hooker had invited him:

> I hardly think it can be managed. I shall want to make *four* drawings on stone for the Dec^{r} number, and hope Mr. Fitch can allow me to do them in his room. Besides, I have refused Mrs. Griffiths on the plea of hurry, & if I have time to go anywhere it ought to be to Torquay.

Although there is no evidence for some weeks thereafter of anything but smooth running of the *Phycologia* system, since the work drops out of reference in most correspondence then, it did not become wholly neglected in comments. Harvey, in the field in Roundstone, Ireland, wrote to Robert Ball (Fisher, 1869: 156) about the importance of the dredged first find for Britain of *Peyssonnelia* 'a Mediterranean thing, in fine fruit, a new species (*P. borealis, Harv.*) but having all the generic characters quite perfect.' (22 August 1846). Not long after, he was back in Dublin and hard at the *Phycologia*; 'I must draw forty-eight plates for Reeve between this and Christmas, which will keep me pretty busy.' (Harvey to Robert Ball, 24 October 1846; Fisher, *loc. cit.*). Joseph Hooker and Berkeley continued to correspond on other matters, since the latter was contributing to the current cryptogamic treatments in various numbers of J. D. Hooker's *Flora Antarctica*. The existence of that need to correspond led also to commentary on other subjects, one of which was the *Phycologia*. Joseph Hooker wrote on 15 December (Berkeley Correspondence, vol. **6**, GREV–HOO) that:

> Harveys last number is a mixture of very good & very bad. True it is that colored lithograph does not do justice to his efforts; but there is good reason for that, as it is the defect of the method & no other method is cheap enough. They would be vile in black, & H. does not do them well enough to be engraved even could it be afforded. I fear there is no other way of *lithographing* algae, except CUTTING into the stone as the German's [*sic*] do which is more expensive than printing and unknown as an art in England.

By February 1847, Harvey was well into his *Nereis Australis*, also a Reeve publication, and comparison by both principals of the production and processes was leading to some interesting correspondence! Harvey wrote to W. J. Hooker on 16 February of that year (English Letters, vol. **25**, f. 210):

> I am much obliged to you for the assistance of Mr. Fitch in colouring my Nereis plates—which I fear has been tedious. Reeve is *highly* satisfied with the 25 he has just received, & has written me a long letter, wherein he says that the work I put into the Phycologia plates is not nearly so good! See the bad effects of paying a man! if what I do for nothing are so much better. I am not conscious of having taken more pains with one than the other—but if there be improvements it must be owing to practice.

These two rather similar works were not the only projects Harvey had on the go at that time. A slightly later letter to W. J. Hooker (29 March 1847; English Letters, vol. **25**, f. 211) makes the situation then clear:

> I am by no means so industrious as you give me credit for, and have not so much as looked at a Mexican plant since I sent off your set! So that it will be some time before I have my first part ready. Just now that I have finished the MSS. for 1st. part of Nereis—I must finish off Gunn's Algae for the Journal before I enter on anything else—& shall attack them immediately. They ought to have been done a year ago.—I have then to work out Bowerbanks Corallines—rather a long set, I expect—& those that Joseph promises me from Mr. Darwin—These, with 24 plates for Phycologia, & 25 more for Nereis will give me very full occupation till mid-summer—then I may be ready for Mexico—just before the holidays.

From here onwards, although Harvey's correspondence has much in a similar vein to that quoted earlier, it primarily concerns works other than *Phycologia*; the *Nereis* and Harvey's intentions to make visits to foreign herbaria, mostly in France and Germany, supplant it for the most part in the first half of 1847. It is clear, however, that the *Phycologia* was by no means completely out of mind, Harvey's or his correspondents'. In May 1847, W. J. Hooker was convalescent in St Leonard's-on-Sea (Hastings), following a rather bad bout (beginning in late March) of ear abscesses that required operation. He continued to correspond with Harvey during this time and appears to have lost no opportunity still to promote the sales of *Phycologia*. He wrote (14 May; Sir W. Hooker's Letters to Dr W. H. Harvey, **1832–60**, f. 200):

> I hope I have picked up a Subscriber for your Phycologia in the person of my Hastings Surgeon an F.L.S.—but rather rusty as a Botanist.
>
> On the strength of my connection with Reeve I offered to write & ask for it at Booksellers price & Reeve is a great goon if he do not catch at him, & he likely will hook him in for the Nereis.

Harvey, for his part, was still striving manfully at the composition of future plates and consulting in the matter his long-time helpers such as M. J. Berkeley and Mrs Griffiths. To the former he wrote on 14 May concerning various taxa in the genus *Conferva* (*C. crassa*; *C. linum*; *C. sutoria*). Berkeley had figured *C. sutoria* in his *Gleanings* (Price, 1985) and Harvey sent material he thought to be of the latter for confirmation:

> As I wish to figure all three in one plate, you will much oblige me by saying if this be your plant, and if not, still more so by favoring me with a scrap of the true one. Also, if you happen to have an Agardhian specimen of *C. linum*, which I have not, I shall feel obliged by your comparing my *linum* with it. Mine (from Wicklow) is more robust than the Devonshire plant, published by Mrs. Wyatt, but the difference is hardly sufficient to build a species upon. (Berkeley Correspondence, vol. **6**, GREV–HOO).

This May–June period of 1847 reinitiated a short burst of letters, parts of most of which had relevance for the *Phycologia*. It is probable that Harvey, in Dublin, had not by then received W. J. Hooker's letter of 14 May from St Leonard's when he wrote (18 May) to Hooker (W. J. Hooker, English Letters, vol. **25**, f. 213):

> Mrs. Griffiths has been making kind enquiries of me about your health—she herself has been laid up this spring with a severe attacke of Rheumatism which confines her very much to the house—She is now better but only able to get about, & that seldom, in a chair. She is however as fresh in mind as ever, & I have had some *critical* letters from her lately. I have made a sad affair of *Furcellaria*, not figuring the true fruit ! Scarcely had it been published when Mrs. Griffiths sent me specimens in full fruit, & utterly different from anything I had before. Had I asked her before making the figure—, it would have been all right. Now, I must give a supplementary plate, for the blunder is too gross to be slurred over. . . . The Nereis &c. has taken up more of my time than I anticipated, and it will take every moment between this & vacation to put the Phycologia in a state to be left. I must finish & despatch the plates up to Feb. before I leave home in June. I fear the 2nd part of Nereis will not see the light till next year.

Also probably crossing was another letter *to* Harvey from W. J. Hooker (Sir W. Hooker's Letters to Dr W. H. Harvey, **1832–60**, f. 202), whilst he was still in St Leonard's-on-Sea on 23 May; postal franking was dated 24 May and 25 May respectively. The letter included:

> Our Hastings Surgeon is delighted with your Phycologia. This is a poor coast:—few rocks & all muddy.—a good excuse you will say for my idleness.

Harvey, meanwhile, writing to Hooker on 25 May (English Letters, vol. **25**, f. 215), was replying to the earlier letter (14 May) from Hooker announcing the probable Hastings subscriber.

> The first part of "*Nereis*" is now out of my hands—& Reeve promises it on 1st June. Had you been at Kew I could have wished you to see the Title page & preface for criticism. But there is no time. . . . I hope poor Reeve may sell as many as will cover his outlay, for the sake of *future* books, if for no other—& to keep him in good humour. . . . Thank you for getting the Hastings Surgeon for *Phycologia*. A subscriber living on the Coast, is worth two inland—as he is so much more likely to meet with other subscribers. Besides, a Surgeon in a fashionable Watering place is as good as a column in the Athenaeum. Are you aware that *two* of the plates in the 1st Number had lately to be *re-drawn*. . . .

The end of this letter is not given here; it covers a point of considerable importance that is discussed in detail later in this paper (Appendix IV: 2*B*) and will not be considered further at this time.

Despite Mrs. Griffiths's ill-health at this period (see above), it is no surprise that Harvey saw fit on 18 May to comment on how fresh in mind she remained, nor is it surprising that he himself was then pressurized by the things he needed to complete before his vacation. Presumably it was this crowding that had made him then write to Mrs. Griffiths [letter not traced] in such a way as to cause her to respond on 27 May (curiously, this letter is filed at Kew, Archives Room, as f. 203 in Sir. W. Hooker's Letters to Dr. W. H. Harvey, **1832–60**) that:

> My daughters will be happy to do their best to colour the patterns you may require but would be glad to have them as early as may be convenient, lest they be from home & they would have to be forwarded, which would cause delay.

There is no guarantee that this relates solely or at all to the *Phycologia* (it could have concerned the second part of *Nereis*), although there seems a very strong likelihood that the former was referred to. Either way, Mrs Griffiths's clarity of mind seems hardly in question after this letter and the content of Harvey's own to W. J. Hooker on 18 May.

Berkeley had obviously replied rather promptly to Harvey's 14 May letter to him about *Conferva* [*Chaetomorpha*] (see above), for by 2 June, Harvey was again writing to him, from Dublin, on the same subject, indicating that he (Harvey) had *delayed* [!] responding to Berkeley's letter on *Conferva linum* until he was able to visit 'the habitat here' and obtain fresh specimens. He continued: 'I have now done so, & made my drawing from some, & enclose you a few dried specimens, as the authentic plants of Phycologia. They come from the old station, given in Brit. Flora for C. crassa.' There is a great deal more detailed morphological and nomenclatural discussion of the *Chaetomorpha* situation in that same letter to Berkeley (Berkeley Correspondence, vol. **6**, GREV–HOO); Harvey had clearly appreciated the need to conclude very firmly on who had meant what by which use of the various specific epithets, and had not stinted effort, space or time in explaining his views to Berkeley. He terminated the letter with a postscript note that '*C. linum* will not be published till the January [1848] number of Phyc. so there is plenty of time to think the matter over, if our conclusion be wrong.' From the planning period that these details demonstrate, Harvey was obviously deadly serious about his statement (see above) that he had to send Reeve the plates up to February 1848, before he left in June for vacation. That he kept to his intention, even in the face of the complexities of *Chaetomorpha*, is manifest by the fact that *C. linum was* published in the January 1848 number of this work (pl. 150A; part 25). The commitment that the pressure to keep to his intention entailed probably accounts for the lack of any correspondence of significance to *Phycologia* and to movement patterns until we reach the 'Feast of St. Barnabas' [11 June], 1847, when Harvey announced to W. J. Hooker (English Letters, vol. **25**, f. 220 [filed out of date order]) that he was crossing to Liverpool on Monday evening [14 June 1847], to reach London by Wednesday morning [16 June 1847]. On 13 June he confirmed to Hooker (English Letters, vol. **25**, f. 217) his intention of leaving during the evening of the next day for Liverpool, but promptly (on precisely the evening when he was supposed to be leaving, 14 June; English Letters, vol. **25**, f. 218) countermanded that to indicate that after all he *was* going to stand and canvass for the Dublin Society Chair, thereby needing to delay leaving in order to both apply and canvass. One week later, on 21 June [a Monday] 1847, he wrote concerning his canvass, indicating he could not leave 'as soon as hoped' (English Letters, vol. **25**, f. 219). Precisely one day later, 22 June 1847 [Tuesday], (English Letters, vol. **25**, f. 221) he announced crossing to Liverpool 'tomorrow evening' [Wednesday, 23 June 1847], being in London by Thursday [24 June] night, Kew by Friday [25 June 1847], Oxford on Saturday [26 June 1847]. All the letters of ff. 217–221 inclusive were from Dublin (Trinity College). His next, on 29 June [Tuesday], was written to Kew from Oxford, requesting (English Letters, vol. **25**, f. 222) that mail stay at Kew until he returned from Oxford. He must have done that by 2 July at the latest, for by then Joseph Hooker was writing to Berkeley (Berkeley Correspondence, vol. **6**, GREV–HOO) stating baldly:

> all well here [Kew] & Harvey with us. in great haste.

In a sense, it is a pity that when Harvey visited the Hookers at Kew (a not infrequent event), the usual detailed interchange of data between them in correspondence naturally enough dried up until he had again left to return home or to travel on elsewhere. Information on the course of events at such times tends to be derived from correspondence between either the Hookers and other colleagues, or Harvey and his other correspondents; or between those (outside that usual pattern involving one of the principals) who were naturally enough keeping each other *au fait* with events of botanical interest in a general sense. Harvey's invoking of the maximum number of hands to form a reservoir of information and material for *Phycologia* meant that he, the Hookers, and the work itself were often the subjects referred to in that general updating of news. An example of news exchange between those not directly in the Harvey-Hookers circle (although both correspondents were closely involved with much of the phycology proceeding in Britain at the time) is provided by a letter from G. H. K. Thwaites to Berkeley (Berkeley Correspondence, vol. **10**, RAL–THW), written from Bristol on 11 August 1847, in which Thwaites discussed a new species of *Sphaerozyga*, which he asked permission to call *S. Berkeleyi*, indicating that figure and description 'will appear in the "Phycologia"'.

Harvey's 'vacation' in 1847 stretched from early July until 23 August, so far as being out of Britain was concerned. On the latter date, he wrote to W. J. Hooker (English Letters, vol **25**, f. 223) at Kew from the London Coffee House on Ludgate Hill, saying that he had just returned from the Continent and wanted to stay at Kew tomorrow [i.e., Tuesday, 24 August]. No sooner had that letter left his hands for Kew than he was again countermanding the message. By the evening of Monday [23 August] he wrote again from the London Coffee House indicating that 'since I wrote this morning' his elder brother had arrived in London for a few days and he [William] was going to remain with him; he apologized for any difficulties caused (W. J. Hooker, English Letters, vol. **25**, f. 224). His 'few days' probably stretched somewhat, for on 'Sunday morning' he was writing to W. J. Hooker (English Letters, vol. **25**, f. 225) from 3, Ryder Street, St James, indicating that he was sorting plants and asking where he could leave a parcel for Colenso; he continued that he was going to Milltown Malbay (Ireland) to join some friends for a fortnight, that he was going to catch the Waterford steamer from Bristol on 'Friday next', going thence to Limerick and the west, and that he would be in Kew on Wednesday to say cheerio. Joseph Hooker wrote to Berkeley (Berkeley Correspondence, vol. **6**, GREV–HOO) from Kew on 3 September 1847 indicating: 'Harvey is now with us, he says that he called upon Montagne [in Paris] & left his card after the dinner at Webbs.' If Harvey was already back in Kew by 3 September, then the Sunday morning letter from Ryder Street must have been written on 29 August; however, Harvey cannot have kept to his suggestion, in that letter, of leaving from Bristol on 'Friday next' for Waterford and Limerick, since Friday *was* the 3rd September, the day Joseph Hooker indicated to Berkeley that Harvey was with them in Kew. Apart from that, he spent time actually *in* Bristol, visiting G. H. K.Thwaites and admiring his freshwater preparations; this is established in W. J. Hooker, English Letters, vol. **25**, f. 226; 20 September 1847. He then left for Ireland. Harvey was, however, in Limerick by 20 September, for it was he who wrote the letter referred to above, in which he comments on having had a tedious 36-hour journey from Bristol. Thereafter, he was in Miltown Malbay [usually now rendered 'Milltown'], in Co. Clare, on which he commented in a letter from Trinity College to Berkeley (Berkeley Correspondence, vol. **6**, GREV–HOO) and written on 18 October:

> At Miltown Malbay last month [he travelled there from Limerick, arriving on 21 September and returned thence to Plassey, Limerick, on 8 October] I was so fortunate as to find Ryt.[iphlaea] complanata in some plenty—& send you specimens. . .

This same letter is a generally illuminating one on the subject of that summer. It tells us both when he finally returned to Dublin—a postscript note stated 'I came home only last Saturday.' [which day would have been 16 October; the 18th was a Monday]—and gives a deal of information about his period in Paris during the 1847 summer.

From Harvey's comments in the letter of 18 October, Montagne was not pleased that

Harvey had managed to call on him in Paris at a time when he was not at home, and even less that there had been no repeat of the attempt to see him. Joseph Hooker had relayed this information to Harvey, presumably having heard by letter from Montagne to this effect. Harvey's side of the affair was elaborated in a letter to Berkeley (the same of 18 Oct.) when he said:

> I had not the most distant intention of hurting the good mans' feelings and am heartily sorry if I have done so. But really my time in Paris was not my own—as I was compelled to act as Cicerone to two novices—(one of them old Mr. Mackay, who required an arm to lean on)—and I left in a hurry. It was *necessary* to verify Lamarck's & Lamouroux's Corallines at the Museum—& this was all I did there. I wish you could pour balm into the festering wound—when you write next.

The need to consult the collections in Paris had earlier been expressed by Harvey in his letter of 12 May 1847 to W. J. Hooker (English Letters, vol. **25**, f. 212); he had there stated something of his wider intentions for the coming summer, including data on the Oxford and proposed continental visits. Paris was necessary for herbarium work before he started work on the southern Corallines, perhaps for part 2 of the *Nereis*. Harvey continued:

> And being in Paris I may as well make a little more extended tour—so I have again thoughts of joining John Ball on his Swiss excursion—On my return I propose to make a short detour into North Germany—via Hamburgh [*sic*] to Berlin—perhaps. There is a fine collection of Algae in Hamburgh, that I should like to see, if in the neighbourhood—*Senator Binder's*. He is an old correspondent of mine & has sent me good things, *for a German*. I should also try to see friend Kützing.

It has not proved necessary for the purpose of the present paper to establish further the extent to which Harvey actually carried out the proposed itinerary, but the fact that he was away for the best part of two months would indicate the likelihood of his having achieved a major proportion of the plans.

It was probably inevitable that, with the similarity between the overall form and general aims of the two works, the *Phycologia* plates would be compared to those of the *Nereis*. Reeve himself made such comparisons, which were passed on in no uncertain terms by Harvey to W. J. Hooker in his letter of 16 February 1847, quoted earlier. Reeve's opinion was that the *Phycologia* plates were 'not nearly so good' as those of the *Nereis*; Harvey's response was that he was not conscious of taking more pains with one than with the other, and betterment must have resulted from more practice. Conscious of it or not, it seems Harvey could probably depend only on the fact that, as usual, people would see and assess things in very different ways. By 27 November 1847, Harvey was writing to W. J. Hooker (English Letters, vol. **25**, f. 230) from Trinity College with a plaintive *cri de coeur*:

> You have not noticed the *poor Nereis* yet in Journal. Pray give it a chance. It sells wretchedly—& I fear Reeve will give it up. I have seen but one notice of it—in the Eclectic—which praised all but the plates, which it said were like the *coarser ones* of the Phycologia.

The opinion expressed here on the *Nereis* is pretty well diametrically opposed to that of Reeve himself as to the plates, and doubtless reflects the probability of widely spread differences of opinion amongst those interested.

At the time this 27 November letter was penned by Harvey to W. J. Hooker, it seems that Reeve's situation was causing Harvey some concern, as well it might having regard to the extent of commitment to works in progress. He asked of William Hooker (continuation of the letter of 27 November):

> Do you know whether Reeve is going back in the World ?—His taking a partner looks odd.—And he has not paid me for *two* months—a circumstance which

> never occurred before. Moreover, a friend told me to look after him. These are trying times to business folk, and I fear he may have been engaging in too many concerns.

It was perhaps fear of Reeve's situation, as well as the attractiveness of Van Voorst's offer regarding publication of *The Sea-side Book*, that made Harvey seriously consider the latter and correspond on the matter with W. J. Hooker. He opened the subject in his letter of 10 December 1847 (English Letters, vol. **25**, f. 231), commenting that

> Van Voorst offers me £25 to write *192 pages the size of note paper* (12$^{\text{mo}}$?)—about the seaside commencing with seaweeds & going up to whales. There are to be 50 wood cuts for which he offers to *pay*, in addition. Pray tell me how much he ought to give me for making *a pencil drawing on the wood*—this being what I am required to do. The book is to sell for 5/-—and to be quite popular.

William Hooker was favourably inclined towards Van Voorst's offer (Sir W. Hooker's Letters to Dr. W. H. Harvey, **1832–60**, f. 217):

> Van Voorst's offer is I trust more to your mind, especially if the 192 pages are to be on note paper such as you & I write upon & in as large characters as you & I employ. As to pay, for Woodcuts, or rather the drawings on the wood:—that must depend much on the work that is in them. I should say they ought not to be less than 5/–$^{\text{s}}$ each:—say in size the 4$^{\underline{\text{th}}}$ of an 8$^{\underline{\text{vo}}}$ drawing, which always fetches £1.

Harvey and Van Voorst reached agreement about this text, which proved a very popular item when it appeared, going through several editions and providing a medium for Harvey to advertise as further reading several more detailed works, including his own *Phycologia Britannica* and *Manual*, on different groups.

Earlier in the present account, I referred to the degree of forward planning that Harvey's movements and lengthy absences necessitated if anything like a reasonable working sequence were to be maintained. Another example of this is provided by the letter Harvey wrote on 27 January 1848 to C. E. Broome (Broome Correspondence, vol. **4**, COO–HAR), with whom he was exchanging plants in order to enrich the Dublin Herbarium with Fungi, a group not then well-represented there. Receipt of specimens of the latter led Harvey to reciprocate with British Algae 'which I hope will please you—Among them are two of the very rarest and most *curious* on the British list—Carpomitra Cabrerae & Stenogramme interrupta. The latter will be figured in the March number of the Phycologia.' It duly was so figured (as plate 157, in part 27; published on 1 March 1848) and in due course led to further correspondence. In the text to that species, Harvey commented that it was the most important addition to the British marine flora since the commencement of *Phycologia Britannica*, having been discovered on 21 October 1847 by John Cocks, amongst the drift at Bovisand. Subsequently, a few days later, Rev. W. S. Hore found it again nearby, together with 'the equally rare and curious *Carpomitra Cabrerae*'. This led Cocks to write to Harvey (letter in Herb. Trinity College, Dublin), requesting that should Harvey have again the occasion to mention *S. interrupta*, he rectify the error in the date of the Bovisand first record to 'October 21, 1846 and not as described in *Phycologia* November 1847.' Harvey did subsequently (1851) correct the error, but it should be noted that Cocks's letter itself constitutes a mistake—the only error in Harvey's original plate 157 text was the year of collection, since he had the day and month precisely correct.

At about this time, Harvey began referring to himself in jest as 'Glasnevin', having just been appointed to the Chair of Botany at the Botanic Garden there. The first traced example of this is his letter of 27 January 1848 (W. J. Hooker, English Letters, vol. **26**, f. 187), in which he outlined to Hooker the results of the election for the Chair (Harvey received 202 votes of the 385 voting; the next highest candidate had 71) and signed himself 'W. H. Glasnevin (Elect.)', adding 'I hope you like my new title.' Hooker's reply (3 February 1848) showed due deference in addressing Harvey as 'My dear Glasnevin', but posed awkward questions about the possible animal nature of the supposed Chinese/Japanese 'Enteromorpha intestinalis' published as plate 154 of part 26 (1 February 1848). Harvey's very prompt reply (facilitated by postal services that one cannot but envy from the standpoint of today) on 5 February 1848 represented a humble *mea culpa*—'Alack! Alack! I have put my foot in it.' He had been incautious enough to respond to pressure of the need for copy by failing to check sufficiently. Of these letters, Hooker's of 3 Feb. may be found in Sir W. Hooker's Letters to Dr. W. H. Harvey, **1832–60**, f. 224, whilst Harvey's of 5 Feb. is filed at f. 188 in W. J. Hooker, English Letters, vol. **26**.

At this period, Harvey (apart from his new Glasnevin appointment) was enmeshed in other commitments such as the *Nereis Australis*, of part 2 of which he wrote to Berkeley on 31 July 1848, from Plassey, Limerick, that: '10 plates, toward Part 2. of Nereis have been finished since December last, but nothing further done, nor a word written—so I fear part 2 will not show itself before next spring. I hope it may then see the light.—'. Although he also talked of a West Coast dredging expedition and a few interesting finds, no mention was made of the *Phycologia*. That this is not surprising was further attested by a draft letter (July/August 1848), to Revd. David Landsborough of Saltcoats, that makes a similar point. Berkeley's missive on the subject from Harvey is filed in the Berkeley Correspondence, vol. **6**; the letter to Landsborough is rather less direct a source, having clearly been sent (although I have only traced the draft in the Lovell Reeve Letter Book (Drafts), **1847–1872**, ff. 28–29) inviting the Reverend to undertake the Seaweed volume in Lovell Reeve's popular series of British Natural History 'with coloured illustrations, on a small scale, of some fifty or sixty species'. The draft continues 'Our friend Dr. Harvey to whom we first proposed this is unfortunately prevented from aiding us in consequence of his interest in the Manual of which a second edition has been in contemplation;'. Landsborough had come to Lovell Reeve's attention in this context both from Harvey's suggestion and from the very appropriate style of his review of the *Phycologia Britannica*, published in the *Edinburgh Witness* (see pp. 148–49 and Appendix III(3) p. 203). From a further Lovell Reeve draft (same reference, but ff. 30–31) of a letter to W. Fitch, Hooker's artist and lithographer, and dated 8 September 1848, Landsborough had clearly accepted the commission and Harvey had agreed to give occasional assistance when free and near-by; at least, Reeve seems from the draft so to have presumed. He had taken advantage of Harvey's then presence at Kew to send Fitch a quarto stone relating to the illustrations for the Landsborough book so that Fitch himself could ask Harvey for assistance in arranging the figures. Reeve indicated then that he preferred the figures *not* to be taken from Harvey's work and that, in any event, they should be 'differently dispersed' and perhaps some replaced by drawings from actual plants in Hooker's herbarium.

This pattern of pressure of other commitments kept the *Phycologia* from being an active constituent of Harvey's correspondence for some time. On 23 February 1849, Harvey wrote to Berkeley (Berkeley Correspondence, vol. **6**, GREV—HOO) from Trinity College regarding the 2nd part of *Nereis Australis*, the amount of progress in which since his letter of 31 July 1848 to the same recipient on the same subject being fairly small. By that 31 July, 10 plates for part 2 had been finished 'since December last' (see earlier) and at that time Harvey doubted that part 2 would appear 'before next spring'. Now, on 23 February 1849, 16½ plates out of 25 were finished, but 'It will be decidedly handsomer than the first part.' This was essentially added as a *post scriptum* and Harvey finished off plaintively: 'I only wish it would *sell*. I take *ten* copies myself by way of encouragement to Reeve—He tells me that 38 others have been sold of 1st part—Perhaps when the whole is published it will go off.'

The culmination of this background position for *Phycologia Britannica* gave Lovell Reeve what seems to have been the fright of his life. On 19 May 1849, he replied with some anxiety to a letter that has not been traced, even as a draft, from Harvey. Parts of Reeve's reply are already in print (Price, 1982: 455 and Price, 1984: 439); these sections will not be repeated here. The commencement of the extant draft of Reeve's letter to Harvey is as quoted in 1982: 455. That draft continues, in reaction to Harvey's wish to suspend *Phycologia Britannica* for a year whilst he was in America:

> We have considered the matter very seriously in our Counting House and beg leave to submit the following proposition   to send your stones to America just as we now send to Dublin   Your copy has generally so few corrections that you would no doubt be content to leave it to the supervision of some Friends such as Dr. Greville or Mr. Landsborough; and that could be posted from America without inconvenience. Will you please consider of this, for your letter has thrown us into a state of considerable uneasiness.

From the sequence of publication of parts during Harvey's absence (see Price, 1984) and from a further draft in Lovell Reeve's Letter Book (Drafts) **1847–1872**, it is clear that Harvey acquiesed to the suggestions aimed at avoiding suspension of the *Phycologia Britannica* in his absence. He demonstrated the work that this acquiesence entailed in a letter to N. B. Ward from Trinity College on 30 June 1849 (Fisher, 1869: 163):

> My fingers have latterly been very busy, now with ink and now with colours, and they will have no rest till I get among the green leaves of the Western world. Even the days at sea have their allotted work in preparing *stuff* (an excellent word) for the printers. The greater part of the new edition of the "Manual" is in type, and I expect to prepare index, &c., on the voyage, and to finish off the letterpress of "Phycologia" for the time I shall be absent.

Reeve wrote an undated (as to the extant draft) letter to John Ralfs in Penzance, Cornwall, enclosing Harvey's MS description for *Phycologia Britannica*, plate 282 (*Enteromorpha Ralfsii*, which had been collected by Ralfs in Bangor, Caerns.; the text includes the comment 'I write these lines on the shores of America'). This draft letter can be accurately dated to between 1 and 4 September 1849. The draft reads:

> Having received instructions from Professor Harvey to communicate with you on the subject of a plate intended for the Phyc. Brit. I beg to refer you to his letter &c. inclosed with this and would feel much obliged if you will favour us by returning the manuscript at your earliest convenience. The plate also is needed to be printed off in consequence of there being another plate on the same stone required for the October No. The favour of your early attention will greatly oblige—

That the efforts made and outlined above to maintain continuity of *Phycologia Britannica* during Harvey's absence were worthwhile is undoubted. Many letters attest to this, of which an excellent example is that written from Vire, France, to M. J. Berkeley from René Lenormand, largely on the subject of Harvey's American trip and on-going publications. Mentioning the *Nereis Australis* and the *Phycologia Britannica*, Lenormand said of the latter:

> Je suis enchanté du *Phycologia Britannica* qui se poursuit avec une régularité que nous ne pouvons obtenir pour les publications qui se font en france; Ce sera le *Vade-mecum* de tous ceux qui voudront étudier les productions de nos mers.

Inspired by the marine algal riches he had seen during the American tour, and doubtless gratified by the attention he found his work to receive in the United States (he wrote to his sister Mrs Todhunter, from New York on Christmas Eve, 1849, that 'To this museum [Museum of the Academy, New York] is appended a rich library of natural history, containing most of the beautifully illustrated works on ornithology, besides a very fair set in other branches, amongst which is the Phycologia.'), Harvey embarked on yet another major commitment before the *Phycologia Britannica* could be completed. This was, to use his own words, a 'sort of "Nereis Boreali-Americana"', the precise wording of its eventual title. In writing to C. E. Broome, from Limerick, on 31 July 1850, Harvey (Broome Correspondence, vol. **4**, COO–HAR) described this new 'Nereis' as 'a Quarto with 50 coloured plates which the Smithsonian Institute of Washington undertakes to pay the expense of'. Lovell Reeve was asked to estimate for the costs involved in the printing and publication of this '*Nereis*', and produced a detailed itemised account for print runs of 1500 in Royal Quarto of each of the 50 plates, taken through all stages to finished styling as with the *Flora Antarctica* and the *Phycologia Britannica*. This account was dated 27 September 1850, but clearly did not represent adequately competitive figures, for Reeve wrote to Harvey (draft extant) on 5 October 1850, as from Reeve & Benham, producing an overall lower figure without detailed itemization:

> With the view of competing for the printing of your plates of seaweeds for the Smithsonian Institute, we have made arrangements that enable us to do the whole, black or colour, one with the other, at 8/– p hundred, including supply of Ink and Chalk, proving & three proofs, and use of stone for twelve months. This is the lowest rate at which they can be printed by a *competent* workman.

(These Reeve letter drafts were entered in the Letter Book (Drafts) **1847–1872**, where they occupy ff. 121–122 (27 Sept.) and ff. 123–124 (5 October).)

None of this means that the *Phycologia Britannica* was being neglected at this time; far from it, indeed—Mrs Griffiths was still engaged on seeing to that! Harvey wrote on 11 July 1850 from Trinity College to his relative, Mrs Harvey, in New York, that (Fisher, 1869: 216):

> I have had many letters from Mrs. Griffiths, who is as active as ever in her green old age. She has been touring about for the benefit of her daughter's health; and only a day or two ago she wrote me a long critical letter, giving me information about the *fruit* of one of the Algae, which I had not before known, and which will cause me to put a supplementary plate to the *Phycologia*. She is a wonderful specimen of vigour at eighty-two.

In this same context and whilst at Cushendall in August 1850, Harvey's correspondence with Mrs Alfred Gatty commenced (Fisher, 1869: 217–221). Mrs Gatty had found at Filey what she thought from Harvey's *Manual* to be fruiting *Lomentaria [Chrysymenia] orcadensis*, not previously seen in that state amongst the Orkney material. Hesitant at first because of inadequate experience with the seaweeds, she finally plucked up courage to write to Harvey on this; he immediately replied (from Cushendall, Antrim, 16 August 1850), expressing great interest and asking to see the specimen, at the same time sending Mrs Gatty a sketch from the plate proof of *Phycologia*, plate 301, which was to appear in October 1850. He asked her to send the specimen to Trinity College, by the first week in September, when he would be there, so that he could: 'examine, compare, and return your specimen before leaving home, and I should particularly wish to do so at that time, as I shall have then to send forward the MS. of the "Phycologia Britannica" description of *Chrysymenia Orcadensis* to the printer.' Harvey finally decided to publish in the October 1850 part as *Chrysymenia rosea* var. *orcadensis* and to give an Appendix plate of the Filey plant as '*C. rosea, vera*', the original figure and description being left entirely as established from the Orkney material. The Gatty/Harvey correspondence on British algal topics continued unabated for some months, even years, thereafter, initially to the considerable benefit of *Phycologia Britannica*.

Not long after this, on 7 March [1851], and heaving a metaphorical sigh of relief in one sense, if the underlining of the word '*last*' is anything to go by, whilst experiencing considerable tension in another, if the underlining of '*used up*' has equal weight, Harvey was writing to Berkeley from Trinity College (Berkeley Correspondence, vol. **6**, GREV–HOO), as follows:

> I am now drawing the *last* batch of plates for Phycologia—and am nearly *used up* for subjects. Will you permit me to make use of your *figure* of *Vaucheria submarina* (of which I know nothing personal), or can you give me any additional analysis.—I purpose copying *V. marina* from Lyngbye, having no better data—as my dried specimens are quite worthless.
> I [purpose ?] to omit
> Myrionema clavatum (no specimen)

> Polysiphonia stricta = formosa junior.
> P——— Grevillii = violacea! as I now believe.
> Corallina elongata = (no specimen—& *bad species* ?)
> Callith. purpurascens = a *Myth*.
> √ Conferva arenicola, Berk. = no specimen.
> Porphyra miniata = no specimen.
> Bangia carnea (Conf. carnea, Dillw.) no spec.
> √ Rivularia applanata (no specimen).
> Spirulina Hutchinsiae }—no specimen.
> Sphaerozyga Broomei }
>
> Unless you can put me in the way of any of them.

[The ticks exist in pencil on the original letter; they seem to relate to Berkeley's deciding he could supply material.]

This was followed up by another letter (filed as above) on 7 April [1851], otherwise of the same origin and recipient, responding to Berkeley's reply to the above:

> I am much obliged by your attention to my requests—& sorry that the figure of *Vaucheria* will be too late. I have copied & sent off *Lyngbye's* figure for Phyc.—& the *last batch of stones* have left my hands.

Berkeley's reply to which the above was the response has not so far been traced, but is fairly clear in nature; it obviously crossed in the post with a further supplementary request from Harvey (also filed in the Berkeley Correspondence) written on 2 April 1851, and concerning the first item on the omissions listing in the 7 March letter. *Myrionema clavatum*, as implied from the supplementary letter, was finally included as plate 348 of part 58 (1 May 1851), partly on the basis of data (both descriptions and a sketch) provided by Berkeley responding to Harvey:

> May I again trespass on your good nature by asking you to copy on the enclosed sheet from Carmichael's MSS., if in your possession, any additional descriptions of *Myrionema clavatum*, and to send it then to Reeve, whose press awaits it.

Berkeley obviously 'put Harvey in the way of' *Conferva arenicola*, and possibly could have of *Rivularia applanata*, as well; the first of these two, ticked (with the second) in pencil on Harvey's original letter, now in the Berkeley Correspondence, was presumably marked by Berkeley to indicate that he could spare material of both these for Harvey—*C. arenicola* appeared on 1 June 1851 as plate 354A. *Rivularia applanata*, by contrast, never did appear in the *Phycologia* and either did not reach Harvey at all, or, like the *Vaucheria marina* (see above), arrived too late to be useful. The rest of the 7 March listing of *desiderata* was presumably beyond the resources that Berkeley could command on Harvey's behalf.

A few other letters relevant to perceiving contemporary opinion of Harvey and his work do exist. Some of those are considered in detail earlier in this examination of the events before and after the publication of the *Phycologia*, where they have importance in other contexts. Those are not repeated in the part of this section which follows, but are re-cited where appropriate, with cross-referencing. Some letters are comparatively unimportant in any other context than the content of the next section and are therefore quoted there. In one or two cases, they could as well have been used here in the background to particular faults in principle or in specific plates/texts; the decisions had sometimes to be arbitrary not to use them. Some were constructively critical, others less so, and that difference has often determined the section in which they have been cited.

The Opinions

In the expression of opinions on published works, two levels are immediately discernible—those supposedly for the producers' ears alone and those made totally publicly. This section principally concerns general views that can be distilled out of either private or public views. The most consistent constituent of all the preserved opinions contemporary or near-contemporary to the work itself seems here to have been general agreement on the magnitude and utility of the task facing the author, although a fairly substantial minority did not, with some justification, like the nuisance represented by the concept of such long-term part works at all. At least the correction of notified errors could be achieved less arduously and more quickly in these part works, although whether that in this case always inspired more cogent, less emotive reactions is open to question. Nevertheless, private criticism was commonly the more constructive than the 'puffing' inherent to many published review situations.

Considering initially those privately-expressed preserved opinions, it has to be said that Harvey was often his own sternest critic, although the criticisms he generated frequently concerned rather the end-products of plate content, organization and processing than they did the textual matter, over which he had more direct control. Much of the personal private criticism by Harvey himself, mostly aimed at Reeve and exchanged (when at all) primarily with the Hookers, has already been quoted earlier in this study. Such letters as concerned this were often of wider significance in establishing general sequence and development of background. Harvey himself was sometimes quite rightly criticized, particularly in the early stages, by both the Hookers (principally) and others (less frequently); generally speaking, this criticism related to plate-crowding and illustrative over-elaboration or repetition, but there were occasions when textual content, or the lack of it, was remarked on.

Letters already quoted that passed between Harvey and others, principally the Hookers, will not be reproduced again here. For a general sequence of such letters, see especially the outlined exchanges of 1846 between the Hookers and Harvey on pp 119–30, with others of occasional relevance appearing thence to p. 137. Not all of these letters were directly critical in style, from either side; a fair proportion discussed various ways of betterment or even, occasionally, allotted deserved praise as appropriate in one direction or the other across the Irish Sea. There was also occasional praise from intermittent private correspondents, such as Mrs Griffiths, but, in the general way of humanity, friends and colleagues in the main wrote only when they had occasion to disagree with Harvey on factual data or when they took exception to the way something was stated or illustrated. Some of such criticisms were actually very valuable, reflecting or echoing as they did something about which Harvey himself was already uneasy, for example the balance of data provided.

Constructive criticisms are usually based on analytical views and may occasionally seem harsh or unnecessarily abrasive. Although Harvey was not unduly disturbed by it, this must have been much the way of things with the letters from William Thompson and Edward Forbes that gave rise to replies, one of which is quoted in Fisher (1869: 158). Thompson, knowing Harvey well, had taken the opportunity to acquaint Harvey with what was being said about his book. Fisher (1869: 157) categorized Harvey's reply of 19 January 1847, which she reproduced in full, as 'marking the candour which was so prominent a feature in both characters.' Presumably Thompson in any case felt he had the right to criticize since he provided much information (often ecological) for the *Phycologia*. Harvey clearly was not greatly perturbed by whatever general gossip there was about the work, although he was much more open to the cogent comments by Thompson himself and, presumably, echoed by Edward Forbes. Harvey's reply to Thompson's letter is important in establishing attitudes to criticism and is not readily available to many, even as published by Fisher (1869: 157); this latter work is infrequent. The reply also shows something of the nature of the Thompson/Forbes criticisms. For all these reasons, the major part of it is reproduced here:

> *Heartless* Thompson
>
> 'Tis dangerous to joke on paper, for a thing looks so different in writing from what it would sound if spoken—the manner being all in all. I was *half* joking in my note, and so were you, I suppose, in yours; but I confess I was only *half*, for I did feel a little nettled. . . . I should then have written with more caution. I am really obliged to you for telling me that my book has been said to have the

> character you mention, for I by no means wish it to be a mere glorification of the said person, or indeed of any person else, myself not excepted. If I lean to glorify any one, it is Mrs. Griffiths, to whom I owe much of the little acquaintance I have with the *variations* to which these plants are subject, and who has often save me from making bad species, and who is always ready to supply me with fruit of plants which every one else finds barren. She is worth ten thousand other collectors; and I don't care a whit if you say (or all the world join you) that my book is merely a trumpet for her praises. For she is a *trump*.
>
> Never mind "gilding your pills." It is wasting refined gold. I like you all the better for telling me exactly what you think, and where I am wrong, and when I am convinced of my error, I hope I shall always try and mend it. I confess that the early numbers were very deficient in information, such as you say is wished for. You and Forbes wrote to me about it, and I have since done my best to mend. I always latterly give the habitats when I know them, and what can I say more? I am forced to restrain myself within two pages. These are enough for most plants, but to-day I have had some February proofs returned to me to be cut down, being much too long. The last few numbers have been much more carefully written, and I intend to keep it up. Whether you see any improvement or not, I cannot say, but I know I take more pains to please.
>
> Ever yours,
> HARVEYA—*Cordata*.

Comparison of the content of early 1846 parts with those of later in 1846 gives some credence to what Harvey stated about care and improved content, although John Ralfs, even later in the currency of the work (he wrote in January 1852, but his comments were about a plate that appeared very late in 1850) indicated from Penzance, Cornwall, to M. J. Berkeley, in Wansford [now Cambridgeshire], about Harvey's *Phycologia* plate of *Calothrix semiplena* [pl. 309; part 52] a constructive criticism that seems to have been something Harvey himself could have resolved:

> I do not believe it is the Lyngbya semiplena Ag. It does not agree with Kützing's Leibleinia semiplena nor with Aresch. Lyngbya lutescens & I think Harvey has been misled by a mistake of Kützing's the latter gives No. 8 instead of 81 for the Lyngbya lutescens of Algae Scand. & as Harvey at No 8 found a morsel of his plant with the Ceramium Rothii (there is none in my copy) he concludes apparently that Kütz. ment [*sic*] No. 8. It is not a true species of Lyngbya or Calothrix. Harvey's specific name (lamellosum) will do very well if the character is not a Generic one. (Berkeley Correspondence, vol. **10**, RAL–THW).

As with any worthwhile on-going part work, however, (at least up to the point where pressures derived from the need to scratch around for copy in the terminal stages begin to intervene), textual content of the *Phycologia* generally shows much greater tightness, balance, organization and market awareness as the sequence progressed. In fairness to Harvey, it should be said that this was achieved as much through continual critical self-examination as from the effects of outside criticism.

Indeed, it is certainly the case that Harvey and his various important correspondents, even the influential and almost ubiquitous Hookers on occasion, did *not always* see eye-to-eye on *Phycologia Britannica* topics. In such cases, Harvey seems normally (and quite rightly) to have stood by what he believed. A case of not seeing things in the same light occurred even as early as the appearance of the first part. Harvey (to W. J. Hooker on 5 January 1846) observed that: 'The woodcut [see Plate 9] looks very well—and is quite an improvement to the face of the book.' but Hooker's opinion was somewhat at variance: 'The Wood-cut might be better.' The woodcut concerned, be it said, persisted on the part-wrappers and volume title-pages from the beginning to the end of the work! A clear enough example of those cases in which Harvey, although listening well to constructive criticism, did not bow to the prevailing winds. It should be added that Hooker Senior would have had ample opportunity to see the woodcut long before it reached the stage of publication. Letters from Harvey (see earlier) to Joseph Hooker, in which Harvey complains of his own making a mess of the algal group for the woodcut vignette and requests Joseph Hooker to have Fitch, the Hookers' artist/engraver, tidy up matters considerably, show very clearly that Joseph consulted his father on the subject at that time in November/December 1845.

By its nature and intent, the present section is principally concerned with the overt opinions, sometimes rather less well-informed or analytical, expressed in published reviews of particular parts or volumes of Harvey's *Phycologia Britannica*. Generally, these were not narrow or focused on particular plates or organisms, but took into account all that was available to review at the time of writing. Although much of the private (written and preserved, although presumably reflecting the ephemeral and verbal) comment *was* so focused on particular organisms or themes, forming the hobby-horses of individual critics, some *was* more generalized and thus has more direct relevance here than might otherwise be thought. That generalized comment was not always critical—considerable praise was occasionally forthcoming. Lenormand, for example, writing to Berkeley on 28 June 1851 (Berkeley Correspondence, vol. **8**, JER–MON), indicated:

> Je suis toujours sans nouvelles de M^r Harvey quoique Je reçoive avec la plus grande exactitude les livraisons de son magnifique *Phycologia Britannica* au fuis et à mesure qu'elle paraissent.

He said much the same in another letter to Berkeley more than a year later (25 August 1852).

Published reviews were not long in coming; Harvey was well-known, his plans for the *Phycologia* well publicized within the reticulate, almost world-wide, network of correspondents, both of the phycological and general botanical worlds of the day. Many of the journals of the time that involved themselves in reviewing published frequently and were continuously avid for copy—there were not then the diversionary alternative modes of almost instant communication that exist today. The texts of the most significant reviews of the present work, in terms of either content of the review or the extent to which the review was subsequently employed as publicity copy, are presented in Appendix III.

Even given the comparatively rapid reviewing of early parts of the *Phycologia*, Harvey was not satisfied. As already indicated above (pp. 133–35), he showed decided signs of being unhappy in what he regarded as both restricted extent of reviewing and poor speed of publicization of his work, particularly as achieved outside his immediate correspondence circle. He wrote to Miles Berkeley (letter quoted above, pp. 120–21) requesting a few lines from him, through his connections with *Gardener's Chronicle*, by way of review. Berkeley was either astonishingly quick off the mark or that review was already being processed, for Harvey's letter was penned on 5 March 1846, and the *Gardener's Chronicle* review (Appendix III, 1) appeared in the issue of Saturday, 14 March 1846. Very little later, Harvey was again requesting publicity, this time of W. J. Hooker in his *London Journal of Botany* (letter quoted above, p. 121). Speed was again something of the essence, since the letter of 23 March 1846, Hooker's reply of 25 March (or 1 April, it is not absolutely clear which), Harvey's further letter referring Hooker for data to the *Prospectus* and to the *Advertisement*, and the *Review* itself (Appendix III, 2), which included the statement that four numbers of the 'beautiful work' were already before the public (and therefore must have been written in early April 1846), all followed in quick succession.

Similarly speedy were two other reviews which, along with the *Gardener's Chronicle* review (Appendix III, 1) already referred to, were used by Reeve in his advertisement published in *The Athenaeum* on 11 April 1846 (Appendix III, 8). Apart from the speed of production of these reviews, it is additionally interesting that they appeared in journals that would not immediately be identified as likely sources of such information in what even then was a somewhat esoteric field, although with much more widespread 'amateur' following, from all sorts of motives, than is ever nowadays the case. It is in some ways surprising that the *Edinburgh Witness* review (*cf.* Appendix III, 3) was not in any way the product of Robert

Kaye Greville, well known to Harvey, W. J. Hooker and the circle, or of any one of a number of others (such as George Dickie, George Johnston or Major Martin) with Scottish connections. Stylistically, however, it points elsewhere and in fact (see p. 142) can be established as the work of Revd David Landsborough, of Saltcoats, Ayrshire. A draft letter from Lovell Reeve to Landsborough (Lovell Reeve Letter Book (Drafts), **1847–1872**, ff. 28–29), written in late July–August 1848, during negotiations on the writing of *A Popular History of British Sea-weeds* (1849 *et seq.*), makes this very clear:

> I have taken the liberty of making this request to you, because the style in which the Review of the Phycologia Britannica was written in the Edinburgh Witness is just the style adapted to our views.

It is, incidentally, of interest that W. Fitch, the Hookers' artist who gave Harvey lessons early on, was responsible for the illustrations to this Landsborough text and that they are often based, by agreement with and involving the consultative aid of, William Harvey, on those published in or prepared for the *Phycologia Britannica*.

Also appearing early in 1846 was a review of the *Phycologia*, in French, in the *Revue Botanique* (Duchartre) (Appendix III, 4); it is not clear by whom this was authored, but it is of such a generalized form and nature that it could have been prepared by Duchartre himself, or by Delessert (who was involved with the production), rather than by one more directly concerned with the benthic marine algae. Since both René Lenormand and Camille Montagne, the latter in reviews published on pages adjacent to those of the present review and clearly identified by the initials 'C.M.', had firm connections with this short-lived journal, it would be strange that a non-phycologist should have been allocated the task ahead of them; it is, however, known (see earlier) that Lenormand was being presented with copies of the parts by Harvey himself and may not therefore have cared to review the work. This does not explain the Montagne situation. If the review had been written by either of the latter, it is strange that initials identifying the author were not appended.

The review seemingly most quoted in support of his advertisements by Lovell Reeve was that appearing in the *Annals and Magazine of Natural History* in June 1846 (Appendix III, 5). This is not long, two sides of a small page size, but was floridly, almost fulsomely, written, in the not infrequent style of reviews of the time. Clearly, the text was written during May 1846, since five available numbers are indicated. Many of the Reeve advertisements in *The Athenaeum* quote *verbatim* from the first half of the final paragraph of this review; such is the case with those of 6 March 1847 (*The Athenaeum*, **1847** (1010): 267), 24 April 1847 (**1847** (1017): 428), and 18 April 1849 (**1849** (1120): 387).

All these and later reviews (for which see the overall group reproduced in Appendix III) have one primary facet in common. They seem primarily concerned with publicizing the existence of an undoubtedly meritorious work which they largely eulogise rather than objectively criticize. Even W. J. Hooker who, when Harvey requested a review of the *Phycologia* (see earlier), rather drily remarked:

> I will not forget a notice of your charming book as soon as I have a little leisure.
> . . . you may safely leave the praise (or otherwise) to *me*

did not in the event issue anything but descriptive eulogy of the work. These review publications are thus more of the nature of, albeit extended, Book Notices on behalf of author and publisher than they are of critical reviews. The nature of the comments made in private in correspondence makes it clear that most of those who examined available plates and text in detail felt there to be occasional facets that required revision and critical comment; indeed, in a work as comprehensively pioneering and carried out largely by one man, however widely knowledgeable, as this then was, with so broad a canvas, it is difficult to envisage that (with or without refereeing submission before publication) such could have been avoided. Harvey himself seems to have regarded *Phycologia Britannica* as a work of future stimulus, not of present perfection. We have not yet reached, if indeed we ever shall reach, anything like the latter state in British marine benthic macrophycology.

The author of the work which is the concern of this present analysis should have the last word in rounding off. I quote from the Preface which Harvey wrote and dated 30 July 1851. With the minor changes of the insertion of ‘pieces of information’ for the present ‘forms of Algae’, of ‘ten’ for the present ‘five’ (years), and of ‘facts’ for the present ‘species’, the quotation will equally well serve as an *apologia* for the present study and any inaccuracies detected in it.

> For these sins [of over- or under-caution in taxonomic assessment throughout] I entreat a charitable criticism on the grounds of excuse offered by a lively Quaker when reproved, by a graver brother, for his witticisms: “Friend, if thou knew how much I keep in, thou wouldst not find fault with what I let out.” And if you, dear Critic, could know the number of puzzling forms of Algae which in the course of the last five years have passed through my hands, and which I have had to reduce to their specific types, you would judge leniently of my mistakes, where I may have been deceived by such forms, and wrongly proposed them as new species.
>
> Whatever may be my errors in this respect, I have the satisfaction to know that the study of British Marine Botany has been fostered and extended by this work; and this, to an author who feels a personal interest in his subject, is the best reward for his labours.

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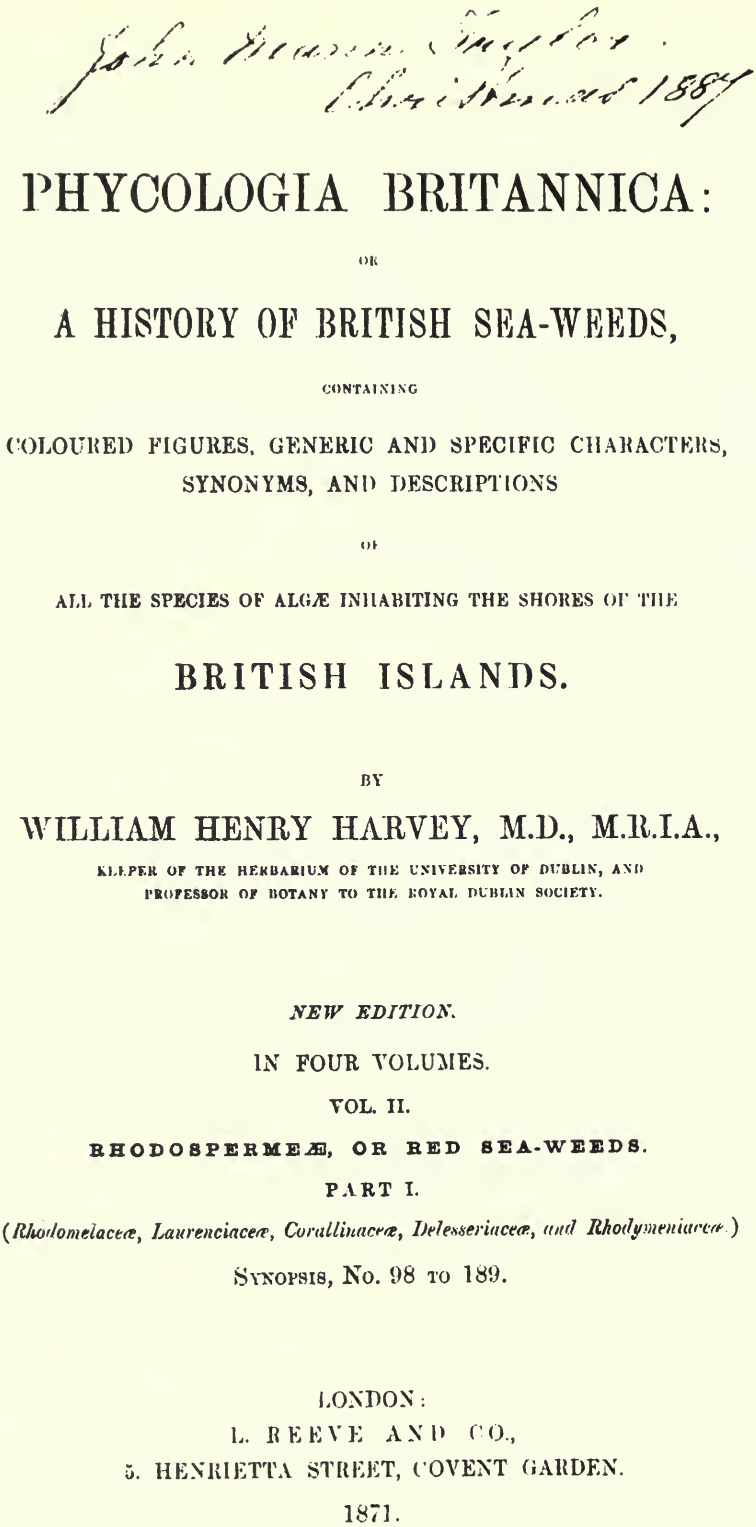


John [illegible] Taylor.
Christmas 1887

PHYCOLOGIA BRITANNICA:

OR

A HISTORY OF BRITISH SEA-WEEDS,

CONTAINING

COLOURED FIGURES, GENERIC AND SPECIFIC CHARACTERS,
SYNONYMS, AND DESCRIPTIONS

OF

ALL THE SPECIES OF ALGÆ INHABITING THE SHORES OF THE

BRITISH ISLANDS.

BY

WILLIAM HENRY HARVEY, M.D., M.R.I.A.,

KEEPER OF THE HERBARIUM OF THE UNIVERSITY OF DUBLIN, AND
PROFESSOR OF BOTANY TO THE ROYAL DUBLIN SOCIETY.

NEW EDITION.

IN FOUR VOLUMES.

VOL. II.

RHODOSPERMEÆ, OR RED SEA-WEEDS.

PART I.

(*Rhodomelaceæ*, *Laurenciaceæ*, *Corallinaceæ*, *Delesseriaceæ*, *and* *Rhodymeniaceæ*.)

SYNOPSIS, No. 98 TO 189.

LONDON:
L. REEVE AND CO.,
5, HENRIETTA STREET, COVENT GARDEN.
1871.

Plate 10 The title-page to the 1871 'New Edition', in this case Volume II of that four-volume issue. The page is reproduced natural size.

Table I

Harvey's *Phycologia Britannica*: synoptic content and arrangement

Additional notes

For more general background, see pp. 94–95.

1. Other signatures occur amongst prefatory and synoptic texts published in association with *Phycologia Britannica* at various times (see Price, 1984). Known examples are as follows:
   SYNOPSIS of orders/genera: p. i ——— signature 'a'
   SYNOPSIS of species: p. i ——— signature 'b'
   p. xxi ——— signature 'c'
   p. xxix ——— signature 'd'
   p. xxxvii ——— signature 'e'
   ALPHABETICAL INDEX, vol. I
   vol. II
   vol. III p. [1] ——— signature 'VOL. III. 2I'

2. For various reasons, no plate was provided for certain species included in the SYNOPSIS; these are:

NO.	*NAME*	*REASON FOR OMISSION*
107	*Polysiphonia stricta*	Supposed young (?) of *P. formosa.*
115	*Polysiphonia Grevillii*	A variety of *P. violacea.*
148	*Corallina elongata*	Omitted, since Harvey had seen no specimen of it and suggested (7/3/1851, to MJB) '& *bad species*?'.
264	*Callithamnion purpurascens*	Unknown to Harvey; he calls it (correctly) a *MYTH* (see letter of 7 March 1851, to Berkeley, quoted in text].
328	*Conferva clandestina*	Unknown to Harvey.
344*	*Porphyra miniata*	Unknown to Harvey (no specimen).
348	*Bangia carnea*	Unknown to Harvey (no specimen).
352	*Rivularia applanata*	Unknown to Harvey (no specimen).
357	*Calothrix mucor*	Unknown to Harvey.
373	*Oscillatoria subsalsa*	Unknown to Harvey.
379	*Spirulina Hutchinsiae*	Unknown to Harvey (no specimen).
385	*Sphaerozyga Ralfsii*	No specimen.

3. It does not follow that known presence of multiple versions of some plate-texts in particular parts necessarily indicates that *all* plates in that same part were produced in more than one printing version of the text, BUT IT IS STRONGLY LIKELY *THAT THIS IS THE CASE.* There is no part, anywhere in the long currency of the work, for which *at least one* (and mostly at least *three*) plate(s) have not been located in multiple text versions. It therefore follows that probably *ALL* the text (except the SYNOPSIS) was reprinted at one time or other, in different versions, on demand.

4. Accessible copies of all plates across all 'editions' require comparison for actual differences and for variation in colouring and wear on the stones. Known varying versions of plate-text probably are usable as a good, although not infallible, guide to likely different versions or printings of the plates in the same part. For general analysis of colour and form in the plates, see Appendix IV.

5. The characteristics of line-end, typeface and punctuation changes between different versions of plate texts are not give in detail here, save in the cases where the nature of the change provided an immediately simple and direct means of checking which version was to hand. It would otherwise have been too space-consuming to explain the relationships between versions. I shall be happy to provide fuller data for particular cases on request, where I have the information.

6. For purposes of this Table and references throughout the text, plate numbers have been converted from the Roman used in print to Arabic.

7. For reasons of ease of reference, and because in general little or no equivocation is thus involved, the nomenclature employed by Harvey for 'species' has been maintained throughout the present study.

8. The note entry in the 'Textual differences' column '2(A)→2(B)' represents the difference in the form of the figure 2 from version A of the text (curved base 2) to version B (flat base 2).

A

PLATE XX.

PHYLLOPHORA BRODIÆI, *J. Ag.*

GEN. CHAR. *Frond* stipitate, rigid-membranaceous, proliferous, nerveless or with a vanishing nerve, cellular; cells minute, angular, gradually smaller toward the surface. *Fructification* of two kinds, on distinct plants;—1, prominent *tubercles* (*nemathecia*) seated on the frond, composed of radiating, moniliform filaments, whose lower articulations are at length dissolved into *spores* (?). 2, *tetraspores* collected into sori, either toward the apex of the frond, or on proper leaflets. PHYLLOPHORA—from φύλλον, a leaf, and φορέω, to bear: a proliferous frond.

PHYLLOPHORA *Brodiæi*; stem cylindrical, filiform, branched, the branches expanding into oblong, simple or forked, flat, membranaceous frondlets, which are proliferous from their extremity; tubercles sessile on the tips of the segments.

PHYLLOPHORA Brodiæi, *J. Ag. Alg. Medit.* p. 93. *Endl. 3rd Suppl.* p. 38.

COCCOTYLUS Brodiæi, *Kütz. Phyc. Gen.* p. 412.

CHONDRUS Brodiæi, *Grev. Alg. Brit.* p. 133. *Hook. Brit. Fl.* vol. ii. p. 303. *Mack. Fl. Hib.* part 3. p. 202. *Harv. Man.* p. 78.

SPHÆROCOCCUS Brodiæi, *Ag. Syn.* p. 27. *Lyngb. Hyd. Dan.* p. 11. t. 3. *Ag. Sp. Alg.* vol. i. p. 239. *Ag. Syst.* p. 213. *Grev. Fl. Edin.* p. 295.

DELESSERIA Brodiæi, *Lamx. Ess.* p. 37.

FUCUS Brodiæi, *Turn. Hist.* t. 72. *E. Bot.* t. 1966. *Fl. Dan.* t. 1476.

Var. β. *simplex*; stem short expanding into an oblong, simple or once forked, rose coloured frond; sorus elliptical, composed of tetraspores.

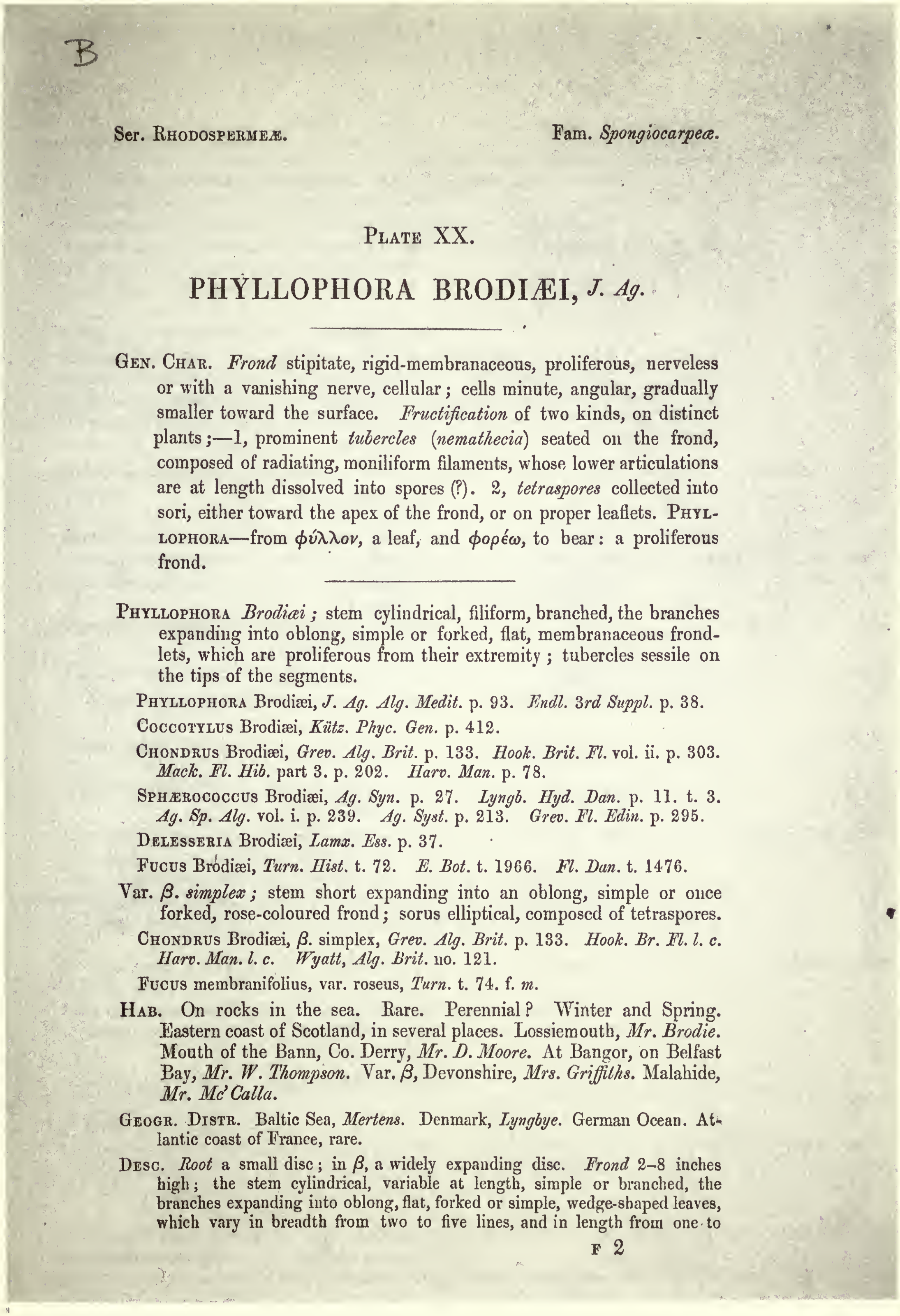
CHONDRUS Brodiæi, β. simplex, *Grev. Alg. Brit.* p. 133. *Hook. Br. Fl. l. c. Harv. Man. l. c. Wyatt, Alg. Brit.* no. 121.

FUCUS membranifolius, var. roseus, *Turn.* t. 74. f. *m.*

HAB. On rocks in the sea. Rare. Perennial? Winter and Spring. Eastern coast of Scotland, in several places. Lossiemouth, *Mr. Brodie.* Mouth of the Bann, Co. Derry, *Mr. D. Moore.* At Bangor, on Belfast Bay, *Mr. W. Thompson.* Var. β, Devonshire, *Mrs. Griffiths.* Malahide, *Mr. Mc'Calla.*

GEOGR. DISTR. Baltic Sea, *Mertens.* Denmark, *Lyngbye.* German Ocean. Atlantic coast of France, rare.

DESCR. *Root* a small disc; in β, a widely expanding disc. *Frond* 2–8 inches high; the stem cylindrical, variable in length, simple or branched, the branches expanding into oblong, flat, forked or simple, wedge-shaped leaves, which vary in breadth from two to five lines, and in length from one to three inches. The *segments* are somewhat truncate, often proliferous from



B

Ser. RHODOSPERMEÆ. Fam. *Spongiocarpeæ.*

PLATE XX.

PHYLLOPHORA BRODIÆI, *J. Ag.*

GEN. CHAR. *Frond* stipitate, rigid-membranaceous, proliferous, nerveless or with a vanishing nerve, cellular; cells minute, angular, gradually smaller toward the surface. *Fructification* of two kinds, on distinct plants;—1, prominent *tubercles* (*nemathecia*) seated on the frond, composed of radiating, moniliform filaments, whose lower articulations are at length dissolved into spores (?). 2, *tetraspores* collected into sori, either toward the apex of the frond, or on proper leaflets. PHYLLOPHORA—from *φύλλον,* a leaf, and *φορέω,* to bear: a proliferous frond.

PHYLLOPHORA *Brodiæi;* stem cylindrical, filiform, branched, the branches expanding into oblong, simple or forked, flat, membranaceous frondlets, which are proliferous from their extremity; tubercles sessile on the tips of the segments.

PHYLLOPHORA Brodiæi, *J. Ag. Alg. Medit.* p. 93. *Endl. 3rd Suppl.* p. 38.

COCCOTYLUS Brodiæi, *Kütz. Phyc. Gen.* p. 412.

CHONDRUS Brodiæi, *Grev. Alg. Brit.* p. 133. *Hook. Brit. Fl.* vol. ii. p. 303. *Mack. Fl. Hib.* part 3. p. 202. *Harv. Man.* p. 78.

SPHÆROCOCCUS Brodiæi, *Ag. Syn.* p. 27. *Lyngb. Hyd. Dan.* p. 11. t. 3. *Ag. Sp. Alg.* vol. i. p. 239. *Ag. Syst.* p. 213. *Grev. Fl. Edin.* p. 295.

DELESSERIA Brodiæi, *Lamx. Ess.* p. 37.

FUCUS Brodiæi, *Turn. Hist.* t. 72. *E. Bot.* t. 1966. *Fl. Dan.* t. 1476.

Var. *β. simplex;* stem short expanding into an oblong, simple or once forked, rose-coloured frond; sorus elliptical, composed of tetraspores.

CHONDRUS Brodiæi, *β.* simplex, *Grev. Alg. Brit.* p. 133. *Hook. Br. Fl. l. c. Harv. Man. l. c. Wyatt, Alg. Brit.* no. 121.

FUCUS membranifolius, var. roseus, *Turn.* t. 74. f. *m.*

HAB. On rocks in the sea. Rare. Perennial? Winter and Spring. Eastern coast of Scotland, in several places. Lossiemouth, *Mr. Brodie.* Mouth of the Bann, Co. Derry, *Mr. D. Moore.* At Bangor, on Belfast Bay, *Mr. W. Thompson.* Var. *β,* Devonshire, *Mrs. Griffiths.* Malahide, *Mr. Mc'Calla.*

GEOGR. DISTR. Baltic Sea, *Mertens.* Denmark, *Lyngbye.* German Ocean. Atlantic coast of France, rare.

DESC. *Root* a small disc; in *β,* a widely expanding disc. *Frond* 2–8 inches high; the stem cylindrical, variable at length, simple or branched, the branches expanding into oblong, flat, forked or simple, wedge-shaped leaves, which vary in breadth from two to five lines, and in length from one to

F 2

Plates 11 & 12 The texts representing versions A (11) and B (12) for *Phyllophora brodiaei* (Plate 20). Note the differences between the two printed versions: i. Different sizes/forms of Greek typeface script; ii. Line shifts (whole); iii. Textual italic size and spacing differences; iv. Basal signature spacing and position differences; v. Word and line-end shifts; vi. Justification errors (to left, version B); vii. Typeface variations (A compared to B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
1.	1	1	1	B	Position shifted right	*Dictyota atomaria*
	2	1	2	B2	No signature	*Delesseria hypoglossum*
	3	1	4	No signature	No signature	*Bryopsis plumosa*
	4	1	1	No signature	No signature	*Ectocarpus brachiatus*
	5	1	3	C	Position shifted right	*Callithamnion gracillimum*
	6	1	4	No signature	No signature	*Cladophora lanosa*
2.	7	1	2	C	No signature	*Polysiphonia furcellata*
	8	1	1	C2	No signature	*Punctaria latifolia*
	9	1	2	No signature	No signature	*Nitophyllum versicolor*
	10	1	2	No signature	No signature	*Polysiphonia richardsonii*
	11	1	1	D	Position shifted right (v. slight)	*Asperococcus turneri*
	12	1	4	D2	Position shifted right; D↔2 spacing wider	*Cladophora rectangularis*
3.	13	1	3	No signature	No signature	*Kallymenia reniformis*
	14	1	1	No signature	No signature	*Carpomitra cabrerae*
	15	1	2	E on *polycarpa*; none on *multipartita*	*multipartita* only – no signature	*Gracilaria multipartita*
	16	1	3	E2	Position shifted right; E↔2 spaced wider	*Griffithsia Devoniensis*
	17	1	1	No signature	No signature	*Chordaria divaricata*
	18	1	4	No signature	Not seen	*Cladophora gracilis*
4.	19	1	1	F	Position shifted right	*Haliseris polypodioides*
	20	1	3	F2	Position shifted right; F↔2 spaced out	*Phyllophora brodiaei*
	21	1	3	No signature	No signature	*Seirospora Griffithsiana*
	22	1	1	No signature	No signature	*Ectocarpus hincksiae*
	23	1	2	G	Not seen	*Nitophyllum Bonnemaisoni[i]*
	24	1	4	G2	No signature	*Cladophora refracta*
5.	25	1	1	No signature	No signature	*Striaria attenuata*
	26	1	2	No signature	No signature	*Delesseria ruscifolia*
	27	1	3	H	Position shifted right; slightly raised	*Wrangelia multifida*
	28 [A&B]	1	1	H2	Position shifted right	A. *Elachistea attenuata* B. *Elachistea velutina*
	29	1	3	No signature	No signature	*Microcladia glandulosa*
	30	1	4	No signature	No signature	*Cladophora Brownii*
6.	31	1	1	I	Position shifted right	*Mesogloia vermicularis*
	32	1	2	I2	Position shifted right	*Rhodymenia bifida*
	33	1	1	No signature	No signature	*Cladostephus verticillatus*
	34	1	2	No signature	No signature	*Odonthalia dentata*
	35 [A&B]	1	4	K	Position shifted right; raised	A. *Codium adhaerens* B. *Codium amphibium*
	36	1	3	K2	Position shifted right; K↔2 spaced wider	*Nemaleon multifidum*

Number in Synopsis	Textual differences between A↔B/C
37 (*Taonia*)	Division lines drawn of different lengths relative to letterpress text (in B, *cf* A).
167	Version A, line 3—'coccidia'; version B—'coccoidea'. Line-end shifts, Comments, version B.
284	Line-end shifts, Comments, version B (especially on reverse).
94	Typeface changes, punctuation changes and line-end shifts (A→B); last 's' missing from 'possessing', line 1, rear A.
269	Line-end shifts, Comments (reverse B).
305	Line-end shifts, Comments (B).
126	Greek accent changes (B); Greek script larger (B).
43	Punctuation changes, typeface changes and line-end shifts (B).
174	See pl. 11. Paper differences, versions B↔C; Greek script larger (B/C).
111	Paper and typeface clarity differences, versions B↔C; Greek script larger (B/C).
47	Version C reprints transpose reverse sides pls 9 and 11 texts; Greek script larger (B).
292	Line 2 Comments (reverse) shows 'Englisn' corrected to 'English' (B); paper differences, B↔C; Greek script larger (B/C).
211	Question-mark form differs, A↔B; paper differences, B↔C; Greek script larger (B/C).
22	Typeface changes, punctuation changes, line-end shifts (B); Greek script larger (B); 'DESC.' (A)→'DESCR.' (B).
185	Originally as *G. polycarpa*; see the text of the present paper (Appendix IV).
243	Line-end shifts, lines 6/7 of General Character (version B).
52	Line-end shift, 'a', line 3 from bottom to line 2 from bottom (version B); typeface changes (B).
300	Not established, but probably usual style differences (especially Greek script larger) in B.
33	Line-end shifts, reverse: *Fucus*, line 3 (A)→line 4 (B/C); *Ecklonia*, line 14 (A)→line 15 (B/C); Greek script larger (B).
201	Line-end shifts and failures of line alignment (version B *cf.* A); Greek script larger (B/C).
248	Line-end shifts and punctuation differences (B); paper differences only (B↔C); 'Autumn', line 2 Comments, decapped A→B; Greek script larger (B).
84	Bar missing from 'H' of Harv., entry title, versions B/C; Greek script larger (B).
171	Not established, but probably usual style differences (especially Greek script larger) in B.
303	Paper differences only, versions B↔C; Greek script larger (B/C).
42	DESC. (A)→DESCR. (B); end-line rise giving alignment variation, legend, lines 1/2 (A); typeface and punctuation changes (B).
168	Line-end shifts, comments and synonymy (B); last line 'transverse'→T.
247	Line alignment shifts, synonymy and elsewhere (B).
64 (as *E. pulvinata*) 65	Line-end shifts (B); typeface changes (B); punctuation changes (B); Greek script larger (B); line 2, HAB. 'Sep.' (A)→'Sept.' (B) [28A].
225	Punctuation changes (B); line 5 from bottom, obverse, '(fig. 7)' (A)→'fig. (7)' (B); Greek script larger (B).
289	Typeface changes (B); larger Greek script (B); 'Br. Pl. 2. p.355' (A)→'Br. Fl.p.2.355' (B) [a correction in error]; 'Coast' (end Habitat)(A)→'coast' (lower case initial) (B).
53	Greek script larger (B); line-end and typeface changes (B); line 9, reverse, Comments, 'Coast' (A)→'coast' (B).
177	Greek accent changes (B); Greek script larger (B).
70	Typeface and punctuation changes (B); Greek script larger (B); 'Shores' (Hab. 2) (A)→'shores' (B).
98	Description, line 9—'born' (A)→'borne' (B); Greek script larger (B).
281 282	Plate number as title rendered 'XXXV. (A).' (version A)→'XXXV. (A.)' (version B); Greek script larger (B).
218	Punctuation changes (B); Greek script larger (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
7.	37	1	1	No signature	No signature	*Sphacelaria scoparia*
	38	1	3	No signature	Not seen	*Naccaria Wigghii*
	39	1	4	L	Position shifted right	*Ulva linza*
	40	1	2	L2	Position shifted right	*Dasya ocellata*
	41 [A&B]	1	1	No signature	No signature	A. *Myrionema leclancherii* B. *Myrionema punctiforme*
	42	1	2	No signature	No signature	*Chylocladia reflexa*
8.	43	1	4	K	Not seen	*Enteromorpha erecta*
	44	1	2	K2	Not seen	*Plocamium coccineum*
	45	1	1	No signature	No signature	*Laminaria fascia*
	46	1	3	No signature	No signature	*Spyridia filamentosa*
	47	1	1	L	Position shifted right	*Fucus serratus*
	48	1	2	As *Bostrychia*, no signature; as *Helicothamnion*, L2	*Helicothamnion* only-position shifted right; raised; '2' reduced to same size as 'L'	*Bostrychia scorpioides*
9.	49	1	1	No signature	No signature	*Desmarestia aculeata*
	50	1	2	No signature	No signature	*Rhodomela lycopodioides*
	51	1	2	O	Position shifted right	*Bonnemaisonia asparagoides*
	52	1	1	O2	No signature	*Fucus mackaii*
	53	1	3	No signature	No signature	*Gelidium corneum*
	54 [A; B; C]	1	4	No signature	No signature	*Conferva arenosa* (C) *Conferva implexa* (B) *Conferva tortuosa* (A)
10.	55	1	2	P	No signature	*Laurencia pinnatifida*
	56	1	1	P2	No signature	*Sporochnus pedunculatus*
	57	1	3	No signature	No signature	*Gloiosiphonia capillaris*
	58 [A&B]	1	4	No signature	No signature	*Calothrix fasciculatus* (A) *Calothrix scopulorum* (B)
	59	1	3	Q	Position shifted right; lower by at least 1 line	*Dumontia filiformis*
	60	1	1	Q2	Position shifted right; raised by one line	*Cystoseira granulata*
11.	61	1	2	No signature	No signature	*Sphaerococcus coronopifolius*
	62	1	4	No signature	No signature	*Lyngbya majuscula*
	63	1	3	R	Position shifted right	*Chondrus crispus*
	64	1	1	R2	Position shifted right	*Arthrocladia villosa*
	65	1	2	No signature	No signature	*Gracilaria confervoides*
	66	1	1	No signature	No signature	*Halidrys siliquosa*
12.	67	1	3	S	No signature	*Griffithsia equisetifolia*
	68	1	4	S2	Position shifted right	*Rivularia nitida*
	69	1	3	No signature	No signature	*Ginnania furcellata*
	70	1	1	No signature	No signature	*Stilophora rhizoides*
	71	1	3	T	Position shifted right	*Peyssonelia Dubyi*

Number in Synopsis	Textual differences between A↔B/C
74	Typeface and punctuation changes (B); Greek script larger (B).
216	Not established (probably usual style differences in B).
342	Line-end shifts in Comments (B).
131	Line-end shifts (B); Greek accent changes and Greek script larger (B).
67	Larger Greek script and Greek accent changes (B); typeface and punctuation changes (B); line 3, M. punctiforme—'Br. Fl.' (A)→'Brit. Fl.' (B).
68	
144	Greek accent changes and Greek script larger (B).
334	Not established, but probably usual style differences (expecially Greek script larger) in B.
175	Not established, but probably usual style differences (especially Greek script larger) in B.
29	Punctuation differences (B); line-end shifts down in main comments and Description (B); 'Mc'Calla' (A)→'McCalla' (B).
239	Line-end down shifts, synonymy and comments (B); Greek script larger (B).
12	Typeface differences (B); Greek script larger (B); line-end shifts and punctuation differences (B); 'Endl. 3' (A)→'Endl. 3rd.' (B).
101	Afterwards as *Helicothamnion*; see text of present paper (Appendix IV). Greek script larger (*Helicothamnion*, A→B).
18	Line-end shifts, up and down, comments (B); punctuation differences (B).
99	Line-end down shifts (B); Greek script larger (B).
134	Line-end downshifts (B); 'Mc'Calla' (A)→'McCalla' (B).
14	'sea' (A)→'Sea' (B), geogr. distribution; 'Mc'Calla' (A)→'McCalla' (B); Greek script larger (B).
191	Alignment shifts, var. *crinale* synonymy (B).
317	Line-end downshifts, comments of 54A/54B (version B).
322	
321	
135	Line-end shifts, Hab. and reverse comments (B); faulty 'into', last line, side 1, version A.
21	Line-end shifts, Hab. and comments (B); typeface changes, synonymy (B); Greek script larger (B): 'Mc'Calla' (A)→'McCalla' (B).
217	Punctuation changes (B); Greek script larger (B).
360	Line-end downshifts, description end, 58A (version B); Greek script larger (B).
359	
208	Line-end shift, lines 2/3 from bottom, reverse comments (B).
5	Typeface and punctuation changes (B); Greek script larger (B).
184	Main head and plate number alignment changes (B); 'Kilbried' (Version B) mis-spelt in Habitat; Greek script larger (B).
365	Division line variations, typeface changes and punctuation changes (B).
197	Punctuation changes (B); Greek script larger (B).
20	Greek script larger (B); typeface changes (B); 'Mc'Calla' (A)→'McCalla' (B); 'sea' (A)→'Sea' (B) in geogr. distribution.
187	Punctuation changes (B).
3	Line-end shifts, e.g. 'lanceolate' from obverse bottom to next up, (B); Greek script larger (B); 'DIST.' (A)→'DISTR.' (B).
240	Punctuation and typeface changes (B).
353	Line-end downshifts (description, B); upshifts (reverse comments, B).
210	Line-end shifts, synonymy, (B); punctuation changes (B); Greek script larger (B).
39	Greek script larger (B); punctuation and typeface changes (B).
203	Vertical alignment differences (B); 'Mc'Calla' (A)→'McCalla' (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
	72	1	1	2T [T2 in many 4 vol. and original part versions]	Position shifted right (T2)	*Asperococcus compressus*
13.	73	1	2	No signature	No signature	*Melobesia agariciformis*
	74	1	2	No signature	No signature	*Melobesia fasciculata*
	75	1	1	U	Position shifted right	*Cutleria multifida*
	76	1	4	U2	Position shifted right	*Calothrix pannosa*
	77	1	3	No signature	No signature	*Callithamnion tripinnatum*
	78	1	1	No signature	No signature	*Himanthalia lorea*
14.	79	1	1	X	Position shifted right	*Alaria esculenta*
	80	1	3	2X	No signature	*Ptilota plumosa*
	81	1	3	No signature	No signature	*Callithamnion floccosum*
	82	1	1	No signature	No signature	*Mesogloia virescens*
	83	1	2	Y	Position shifted right	*Delesseria angustissima*
	84	1	4	[rear side] Y2 [not on all copies]	No signature	*Cladophora Macallana*
15.	85	1	2	No signature	No signature	*Rytiphlaea pinastroides*
	86	1	4	No signature	No signature	*Cladophora Rudolphiana*
	87	1	1	Z	Position shifted right	*Sphacelaria plumosa*
	88	1	3	2Y	No signature	*Catenella Opuntia*
	89	1	1	No signature	No signature	*Pycnophycus tuberculatus*
	90	1	3	No signature	No signature	*Ceramium nodosum*
16.	91	1	1	2A	Position shifted right; 2↔A spaced out	*Padina pavonia*
	92	1	4	2 A 2	Position shifted right	*Porphyra lacinata*
	93	1	4	No signature	No signature	*Codium tomentosum*
	94	1	3	No signature	No signature	*Furcellaria fastigiata*
	95	1	3	2B	Position shifted right; 2↔B spaced out	*Polyides rotundus*
	96	1	4	2 B 2	Position shifted right; A closed up slightly *cf.* B	*Bangia fuscopurpurea*
17.	97	1	3	No signature	No signature	*Iridaea edulis*
	98	1	1	No signature	No signature	*Ralfsia deusta*
	99 [A; B]	1	4	2B	Position shifted right; 2↔B respaced; '2' form changed	A. *Conferva Melagonium* B. *Conferva aerea*
	100	1	3	2 B 2	Position shifted right; characters spaced out	*Grateloupia filicina*
	101	1	1	No signature	No signature	*Myriotrichia clavaeformis*
	102 [A; B]	1	2	No signature	No signature	A. *Polysiphonia obscura* B. *Polysiphonia pulvinata*

Number in Synopsis	Textual differences between A↔B/C
46	Greek script larger (B); typeface and punctuation changes (B); 'disc'→'disk' (Descr., B); 'Colour' (Descr., A)→'colour' (B).
155	Line-end shift, last line, side one (B); 'Mc'Calla' (A)→'McCalla' (B).
154	Line 3 from base, reverse side comments, 'n' omitted from 'different' (B); line-end shifts and vertical alignment errors (B).
32	'Morèe' (synonymy; A)→'Morée' (B); 'Mc'Calla' (A)→'McCalla' (B).
361	Line upshifts, lines 4/5, comments (B); also lines 7/8, reverse comments; Greek script larger (B).
268	Typeface and punctuation changes (B); 'Vol.' (line 3, synonymy) rendered *ital.* (A)→Rom. (B).
16	Typeface changes and line-end shifts (e.g., end of Gen. char.) (version B); Greek script larger (B).
23	Typeface and punctuation changes (B).
223	Turner quotation, middle reverse, begins lower case (A)→CAP. (B); Greek script larger (B).
251	Line 2, reverse—omission of inverted comma after 'History' (version A) corrected in B; line 22, reverse comments, 'synonymes' drops the 'e' (version B); punctuation changes (B); Greek script larger (B).
55	MOSOGLOIA and incorrect heading position (in A) amended in B; Greek script larger (B).
166	'e' dropped from the incorrect (A) 'synonyme' in B; text, line 2, the correct 'rib' (A) becomes in error 'rid' (B); left line ends, vertical alignment errors introduced in B (e.g., line 15, obverse).
293	Figure legend alignment with main text re-set (reverse; B); Greek script larger (B); 'Mc'Calla' (A)→'McCalla' (B).
102	Vertical alignment changes, synonymy heads (B); Greek script larger (B).
302	Greek 'φορέο' corrected to 'φορέω' (B); Greek script larger (B).
75	Line-end shifts (B); Greek script larger (B).
214	Extra line, bottom of face page (B); line-end shifts, Fig. legend (B); full par CAPS of 'PLATE' converted to the usual 'Plate' (B).
9	Greek script larger (B); punctuation and typeface differences (B); type alignment errors (B).
233	'Mc'Calla' (A) changed to 'M^{c}Calla' (B).
34	Line-end shifts and punctuation changes (B); 'Morèe' (synonymy; A)→'Morée' (B).
343	Line-end shifts, comments (B); Greek script larger (B).
283	Greek script larger (B); Greek accents changed (B); line-end shifts and punctuation changes (B); line 3—'opake' (A)→'opaque' (B).
207	Punctuation changes (B); vertical alignment changes, line-end, Gen. char. (B); line-end shifts, synonymy and elsewhere (B).
206	Line 6 from base—'M'Bain' (A)→'M^{c}Bain' (B); Greek script larger (B).
345	—
213	Punctuation differences (A→B); '(Aresch)' (A)→'(Aresch.)' (B).
58	(As *R. verrucosa*): typeface changes (B); punctuation changes (B).
323 324	Line-end shifts, Gen. char., Pt. A (B); Line-end shifts, DESCR., Pt. B (B).
190	Line-end shifts, Comments (Reverse) (B); 'b ranching' (line 2; version A) corrected in version B.
96	Greek script larger (B); Greek accent changes (B); line-end shifts and punctuation changes (B).
120 108	Spacing differences (B); line-end shifts (B); heading for *P. pulvinata* correctly given 'CII B' (A), but incorrectly 'CIII B' (B); Greek script larger (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
18.	103	1	1	2C	Position shifted right	*Dictyota dichotoma*
	104	1	3	2 C 2	Position shifted right	*Gigartina acicularis*
	105 [A; B; C]	1	4	No signature	No signature	A. *Oscillatoria littoralis* B. *Oscillatoria spiralis* C. *Spirulina tenuissima*
	106	1	3	No signature	No signature	*Crouania attenuata*
	107	1	1	2D	Position shifted right; spacing different	*Chorda filum*
	108	1	3	2 D 2	Position shifted right; characters spaced out	*Gymnogongrus Griffithsiae*
19.	109	1	1	No signature	No signature	*Sargassum bacciferum*
	110	1	3	No signature	No signature	*Dudresnaia divaricata*
	111	1	1	E2	Reversed to 2E and position shifted right	*Chordaria flagelliformis*
	112	1	3	2 E 2	Position shifted right	*Halymenia ligulata*
	113 [A; B; C]	1	4	No signature	No signature	A. *Sphaerozyga Carmichaelii* B. *Sphaerozyga Thwaitesii* C. *Spermosira litorea*
	114	1	2	No signature	No signature	*Chrysymenia clavellosa*
20.	115	1	1	F2	Position shifted right; characters respaced out	*Desmarestia ligulata*
	116	1	2	2 F 2	Position shifted right; characters respaced out	*Hypnea purpurescens*
	117	1	3	No signature	No signature	*Cruoria pellita*
	118	1	2	No signature	No signature	*Chylocladia ovalis*
	119	1	4	2G	Position shifted right	*Bryopsis hypnoides*
	120 [A; B]	1	3	2 G 2	Position shifted right	A. *Callithamnion floridulum* B. *Callithamnion Rothii*
21. '(Commencing Vol. 2.)' on part cover	121	2	2	No signature	No signature	*Rhodymenia lacinata*
	122	2	1	No signature	No signature	*Cystoseira foeniculacea*
	123	2	3	VOL. II. B	'VOL. II.' as before (left text); 'B' position shifted right	*Kallymenia Dubyi*
	124	2	4	B2	Position shifted right	*Cladophora Hutchinsiae*
	125	2	3	No signature	No signature	*Callithamnion spongiosum*
	126	2	1	No signature	No signature	*Ectocarpus sphaerophorus*
22.	127	2	2	VOL. II. C	'VOL. II.' as before (left text); 'C' position shifted right	*Rhodymenia ciliata*
	128	2	1	2C	Reversed to C2 and position shifted right	*Punctaria plantaginea*
	129	2	3	No signature	No signature	*Callithamnion Brodiaei*
	130	2	4	No signature	No signature	*Cladophora diffusa*
	131	2	3	VOL. II. D	'VOL. II.' as before (left text); 'D' position shifted right	*Phyllophora rubens*
	132	2	1	D2	Position shifted right	*Ectocarpus mertensii*

Number in Synopsis	Textual differences between A↔B/C
38	Type-face changes and line-end shifts (B); Greek script larger (B); Greek accent changes (B).
194	Line-end shifts and punctuation changes (B); Greek script larger (B); line 16, 'ii' (A)→'2' (B).
372 374 378	Spacing variations, suffix letters of plate heads (version B); line-end shifts and spacing shifts, various parts (B).
222	—
30	Line-end shift, penultimate line of comments and in synonymy (version B); punctuation changes (B); Greek variety script larger (B).
204	Line-end shifts (B); punctuation changes (B); Greek script larger (B).
2	Line-end shift, line 5, reverse (B); italic typeface larger (B).
221	Line-end shift, line 4 from base, comments reverse (B).
51	Typeface changes (B); division line variations (B).
209	Punctuation changes and line-end shifts (B); Greek script larger (B).
381 382 386	Spacing variation, suffix letters in main plate heads (version B); line-end changes in comments (A) and Figure legend layout (B) (version B); Greek script larger (B).
140	Line-end shifts and punctuation changes (B); synonymy, last entry—'clavellosus' (A)→'clavellosa' (B); Greek script larger (B).
17	Typeface changes (B); line-end shifts (near end comments; B); division line differences (B).
189	Line-end shifts (B).
215	'Linn. vol. 17' (A)→'Linn. vol. xvii' (B); punctuation differences (B); line-end shifts (B).
142	Line-end shifts (B); Mc'Bain (A)→M^{c}Bain (B); Greek script larger (B).
285	Few line-end and punctuation changes, descpn and comments (B); Greek script larger (B).
275 274	Line-end shifts, Descr. and elsewhere (B); punctuation changes (B); Greek script changed (B); reverse side, Hab., line 1, 'on' (version A)→'On' (B).
178	Greek accent changes and larger script size (B); punctuation changes and line-end shifts (B); 'Fl. Dan. t. 769' syn. ref. shows raised '9' (B); 'Foeroe' (A)→'Faeroe' (B).
7	Line-end shift, version B (e.g., 'Spain' uptake in Geogr. Distribution (B)); Greek script larger (B).
212	Greek script larger and accents added (B); line-end shifts (B).
294	Greek script larger and accents added (B); line-end shifts, species diagnosis (B).
272	Greek script larger and accent changes (B).
93	Greek script larger and accent additions (B); line-end shifts (B).
181	Greek script larger , with accent changes (B); 'Mc'Bain' (A)→'M'Bain' (B); 'Foeroe' (A)→'Faeroe' (B).
44	Line-end shifts and punctuation differences (B); McBain (A)→M'Bain (B).
256	Greek spelling, script size and accent changes (B); punctuation changes and line-end shifts (B).
295	Fig. legends to Figs 1–3, vertical alignment changes (B); Greek script larger (B).
199	Greek script larger (B).
95	Greek script larger (B); typeface changes (B).

No. (Part)	PL No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
23.	133	2	1	No signature	No signature	*Cystoseira fibrosa*
	134	2	2	No signature	No signature	*Rhodymenia Palmetta*
	135	2	4	VOL. II. E	'VOL. II.' as before (left text); 'E' position shifted right; both parts raised one line higher	*Cladophora arcta*
	136	2	3	E2	Position shifted right	*Callithamnion tetragonum*
	137	2	3	No signature	No signature	*Callithamnion brachiatum*
	138	2	1	No signature	No signature	*Cladostephus spongiosus*
24.	139	2	3	VOL. II. F	Raised overall; 'VOL. II.' as before (left text); 'F' position shifted right	*Ceramium ciliatum*
	140	2	3	F2	No signature	*Ceramium acanthonotum*
	141	2	3	No signature	No signature	*Ceramium echionotum*
	142	2	1	No signature	No signature	*Sphacelaria filicina*
	143	2	1	(left) VOL. II. G (right)	G (right) and shifted right	*Sphacelaria sertularia*
	144	2	3	G2	Position shifted right (slight); spaced out (slight)	*Ceramium flabelligerum*
25.	145	2	2	No signature	No signature	*Chylocladia kaliformis*
	146	2	2	No signature	No signature	*Polysiphonia elongella*
	147	2	2	VOL. II. G	'VOL. II.' as before (left text); 'G' huge shift right, from mid-page (A)→near line end (B)	*Polysiphonia parasitica*
	148	2	2	G2	'G' position under 'l', rather than 'e' of 'simple'	*Laurencia obtusa*
	149	2	1	No signature	No signature	*Sphacelaria fusca*
	150 [A; B]	2	4	No signature	No signature	A. *Conferva Linum* B. *Conferva sutoria*
26.	151	2	2	VOL. II. H	Raised overall; 'VOL. II.' as before (left text); 'H' position shifted right	*Delesseria sanguinea*
	152	2	2	H2	Raised overall; position shifted right; spaced out	*Laurencia dasyphylla*
	153	2	1	No signature	No signature	*Ectocarpus pusillus*
	154	2	4	No signature	No signature	*Enteromorpha intestinalis*
	155	2	2	VOL. II. I	'VOL. II.' as before (left text); 'I' position shifted right	*Polysiphonia variegata*
	156	2	1	I 2	Position shifted right	*Myriotrichia filiformis*

Number in Synopsis	Textual differences between A↔B/C
8	Line-end shifts, Gen. Char. (B); Greek script larger (B).
179	Line-end shifts (B); Greek script larger, with accent changes (B).
307	Line-end changes, lines 12/13, reverse comments (B); Greek script larger (B).
257	Punctuation changes (B); Greek script larger (B).
258	Line-end shifts and punctuation changes (B); Greek script larger (B); M'cBain (A)→M^{c}Bain (B); line 1 from base, face page, 'toward' (A)→'towards' (B).
71	Greek script larger (B); Greek accents added (B).
238	Greek script larger and accents added (B); 'Danm.' (A)→'Damn.' (B).
237	Greek script larger and accents added (B); punctuation changes (B).
236	Greek script larger and accents added (B).
72	Line-end shifts (B); Greek script larger (B).
73	Corrections (e.g., 'elliptical') and line-end shifts (B); Greek script larger (B); M'Calla (A)→M'Calla (B).
235	Line-end shifts, especially in Gen. Char. (B); Greek script larger and accents added (B).
143	Greek script larger and accents added (B); line-end shifts and punctuation changes (B).
113	BMNH text sheet annotated [MS G. Tandy] '. . . another plate of P. elongella in subsequent edition.'; Greek script larger and accents added (B); punctuation changes (B).
128	Greek script larger and accents added (B); line-end shifts (B).
137	Mid-reverse side, comments, 'obelisc' (A)→'obelisk' (B).
77	Line-end shifts (B); Greek script larger and accents added (B).
319 320	Punctuation, line-end shifts and abbreviation differences (A→B).
163	Punctuation changes and spacing differences (B); vertical alignment differences, synonymy heads (B).
138	Punctuation changes and line-end shifts (B); Geogr. Distr., line 2, 'Sea' (A)→'Seas' (B).
87	Greek script larger and accents added (B); typefaces changes (B).
331	Greek script larger and accents added (B); punctuation changes (B); 'disc' (A)→'disk' (B).
119	Greek script larger and accents added (B); punctuation changes (B).
97	Greek script larger and accents added (B); line-end shift, para. 1, reverse (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
27.	157	2	2	No signature	No signature	*Stenogramme interrupta*
	158	2	1	No signature	No signature	*Fucus nodosus*
	159	2	3	VOL. II. K	'VOL. II.' as before (left text); 'K', position shifted right	*Callithamnion Borreri*
	160	2	4	K2	Slight positional shift right; figure '2' form change	*Schizothrix Cresswellii*
	161	2	3	No signature	No signature	*Nemaleon ? purpureum*
	162	2	1	No signature	No signature	*Ectocarpus siliculosus*
28.	163	2	3	VOL. II. L	'VOL. II.' as before (left text); 'L' position shifted right	*Phyllophora membranifolia*
	164	2	3	L2	Position shifted right; spaced out	*Callithamnion cruciatum*
	165	2	3	No signature	No signature	*Callithamnion barbatum*
	166	2	2	No signature	No signature	*Lithocystis allmanni*
	167	2	2	VOL. II. M	'VOL. II.' as before (left text); 'M' position shifted right	*Polysiphonia urceolata*
	168	2	2	M2	Position shifted right; spaced out	*Polysiphonia formosa*
29.	169	2	2	No signature	No signature	*Nitophyllum Hilliae*
	170	2	2	No signature	No signature	*Rytiphlaea complanata*
	171	2	4	VOL. II. N	'VOL. II.' as before (left text); 'N' position shifted right	*Ulva latissima*
	172	2	2	N2	Slight shift right (one letter space only)	*Polysiphonia atro-rubescens*
	173 [A; B; C]	2	4	No signature	No signature	A. *Sphaerozyga Broomei* B. *Sphaerozyga Berkeleyana* C. *Spermosira Harveyana*
	174	2	4	No signature	No signature	*Cladophora pellucida*
30.	175	2	2	VOL. II. O	'VOL. II.' as before (left text); 'O' position shifted right	*Rhodymenia jubata*
	176	2	1	2O	Reversed to 'O2' and position shifted right, with widened spacing	*Leathesia Berkeleyi*
	177	2	2	No signature	No signature	*Gracilaria erecta*
	178	2	1	No signature	No signature	*Sphacelaria cirrhosa*
	179	2	3	VOL. II. P	'VOL. II.' as before (left text); 'P' position shifted right	*Callithamnion Turneri*
	180	2	4	P2	Position shifted right	*Cladophora rupestris*

Number in Synopsis	Textual differences between A↔B/C
176	Greek script larger and accents added (B); punctuation changes (B).
13	Greek script larger and accents added (B); 'Sea-weed' (A)→'seaweed' (B).
266	Line-end shifts (B); punctuation changes (B); '74' in E.Bot. 1741 ref., synonymy, dropped badly (B); Greek script larger (B; but not proven as same size as usual B Greek).
355	Line-end shifts (B); Greek script slightly larger and accent differences (B).
219	Line-end shifts and punctuation changes (B); Greek script larger (B).
80	Greek script slightly larger than usual A form, but not up to size of usual B form.
200	Greek script larger and accents added (B); line-end shifts and punctuation changes (B); 'Danm.' (A)→'Damn.' (B).
250	Greek script larger and accents added (B); punctuation changes (B); 'Danm.' (A)→'Damn.' (B).
253	Greek script larger and accents added (B).
162	Head change:Corallineae? (A)→Corallineae (B); Greek script larger and accents added (B); line-end shifts (B).
106	Greek script larger and accents added (B); 'Danm.' (A)→'Damn.' (B); 'characterised' (A)→'characterized' (B).
107	Greek script larger and accents added (B); punctuation changes (B); 'Danm.' (A)→'Damn.' (B).
170	Greek script larger and accents added (B); punctuation changes (B); 'Hutchin's' (A)→'Hutchins' (B); 'Danm.' (A)→'Damn.' (B).
103	Greek script larger and accents added (B); punctuation changes (B).
340	Line-end changes, comments (B); 'Danm.' (A)→'Damn.' (B).
125	Greek script larger and accents added (B); 'Danm.' (A)→'Damn.' (B).
383 384 387	Greek script larger and accents added (B); authority citation, 'MSS' (A)→'mss' (B).
291	Greek script larger and accents added (B); punctuation changes (B).
182	Greek script larger (B); 'Danm.' (A)→'Damn.' (B); '0' in 404, Kütz. Phyc. Gen. ref. is *W.F.*→should be fig., not Cap. 'O' as B.
57	Ital. face larger and more spaced (B); 'Danm.' (A)→'Damn.' (B).
188	Line-end shifts (B); 'Danm.' (A)→'Damn.' (B).
76	Greek script larger (B); punctuation changes (B); 'Danm.' (A)→'Damn.' (B).
252	Line-end shifts (B); Greek script larger (B); 'Danm.' (A)→'Damn.' (B); 'ramuli' (line 3, synonymy, A)→'ramulii' (B); 'Hist. fucorum' without inverted commas (A), or with (B).
297	Punctuation changes and line-end shifts (B), in comments; Greek script larger (B); usual change in form of M^{c}Calla (B).

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31.	181	2	3	No signature	No signature	*Ceramium rubrum*
	182	2	1	No signature	No signature	*Ectocarpus tomentosus*
	183	2	1	VOL. II. Q	'VOL. II.' as before (left) text); 'Q' position shifted right (and longer tail)	*Ectocarpus amphibius*
	184	2	3	Q2	Position shifted right; spaced out	*Griffithsia setacea*
	185	2	3	No signature	No signature	*Griffithsia secundiflora*
	186 [A; B]	2	4	No signature	No signature	A. *Lyngbya carmichaelii* B. *Lyngbya speciosa*
32.	187	2	3	VOL. II. R	'VOL. II.' as before (left text); 'R' position shifted right	*Chondrus Norvegicus*
	188	2	3	R2	Position shifted right; spaced out	*Callithamnion tetricum*
	189	2	1	No signature	No signature	*Sphacelaria radicans*
	190	2	4	No signature	No signature	*Cladophora laetevirens*
	191	2	3	VOL. II. S	'VOL. II.' as before (left text); 'S' position shifted right	*Ptilota sericea*
	192	2	1	S2	Position shifted right	*Laminaria phyllitis*
33.	193	2	3	No signature	No signature	*Ceramium diaphanum*
	194	2	1	No signature	No signature	*Asperococcus echinatus*
	195	2	2	VOL. II. T	'VOL. II.' as before (left text); 'T' position shifted right	*Polysiphonia brodiaei*
	196	2	4	T2	Position shifted right; spaced out	*Cladophora glaucescens*
	197	2	1	No signature	No signature	*Ectocarpus litoralis*
	198	2	2	No signature	No signature	*Laurencia tenuissima*
34.	199	2	3	VOL. II. U	'VOL. II.' as before (left text); 'U' position shifted right	*Gigartina mamillosa*
	200	2	1	U2	Position shifted right; 'U' spaced from '2'	*Ectocarpus granulosus*
	201	2	2	No signature	No signature	*Corallina squamata*
	202	2	2	No signature	No signature	*Nitophyllum punctatum*
	203	2	2	VOL. II. X	'VOL. II.' as before (left text); 'X' position shifted right	*Nitophyllum punctatum*
	204	2	1	X2	Position shifted right; 'X broken lower left' (A)→'X perfect' (B); signature size change (B)	*Fucus vesiculosus*

Number in Synopsis	Textual differences between A↔B/C
226	Greek script larger (B); 'Danm.' (A)→'Damn.' (B); last line, obverse, 'hog's' (A)→'hogs' '(B).
85	Greek script larger (B); 'Danm. no.' (A)→'Damn. n.' (B); line-end change, lines 11/12, reverse.
81	Greek script larger and accents added (B).
246	Punctuation changes (B); 'Danm.' (A)→'Damn.' (B).
245	Greek var. letters larger (B); '*Crouan*, MS' (A)→'*Crouan, ms*' (B).
367 368	'p' of 'purple', Gen. Char., line 3, part A, misaligned at margin (B); 'MS' (A)→'ms' (B); 'Danm. no.' (A)→ 'Damn. n.' (B).
198	Line-end shifts (B); Greek script larger (B); 'Danm.' (A)→'Damn.' (B); '2' (A)→'2' (B); '(Stack.)' (A)→ '(Stack).' (B).
259	Greek script larger (B); Wyatt synonymy ref. 'no. 141' (A)→'*n*.141' (B); 'Danm.' (A)→'Damn.' (B); 'Mc'Calla' (A)→ 'M'Calla' (B).
78	Greek script larger (B); 'Danm.' (A)→'Damn.' (B).
298	'-ra' of *Cladophora*, line 3, Gen. Char., spaced away from rest of word-stem (B); Wyatt 'Danm.' (A)→'Damn.' (B); Greek script larger (B).
224	Greek script larger (B); 'Danm.' (A)→'Damn.' (B).
28	'Mc'Bain' (A)→'McBain' (B); punctuation changes and division-line variations (B).
230	Punctuation changes (B); line-end shifts (B); Greek script larger (B); 'Danm.' (A)→'Damn.' (B); 'no.' (A)→'n.' (B); 'Morèe' (Synonymy; A)→'Morée' (B).
48	Greek script larger (B); 'Danm.' (A)→'Damn.' (B)
118	Punctuation differences (B); Greek script larger (B); 'Danm. no.' (A)→'Damn. n.' (B); '2' (A)→'2'(B).
308	Line-end shifts, comments (B); Wyatt's 'Danmon.' (A)→'Damnon.' (B), reverse comments; Greek script larger (B).
90	Text uneven, lead edge, Descpn. (B)) Greek script larger (B); Danm. (A)→Damn. (B).
139	Punctuation differences (B); 'Danm. no.' (A)→'Damn. n.' (B); '2' (A)→'2' (B).
196	Line-end shifts and punctuation differences (B); Greek script larger (B); 'substance' (A)→'Substance' (B).
92	Line-end shifts, legend (B); Greek script larger (B); punctuation changes (B); typeface changes (B).
149	Punctuation differences (B); line-end shifts (B); 'hog's' (A)→'hogs' ' (B).
169	Punctuation differences (B); '2' (A)→'2' (B); 'Fl. Eden.' (B)↔'Fl. Edin.' (A); line-end shifts (B); Greek script larger (B).
169 bis	Line-end shifts and punctuation differences (B); printing position errors corrected (A→B).
10	Greek script larger (B); punctuation and line-end changes (B); 'Danm. no.' (A)→'Damn. n.' (B); spelling differences and typeface changes (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
35.	205	2	2	No signature	No signature	*Gracilaria compressa*
	206	2	3	No signature	No signature	*Ceramium gracillimum*
	207	2	4	Vol. II. Y	'Vol. II.' as before; Y shifted *slightly* right	*Cladophora uncialis*
	208	2	2	Y2	Position shifted right; ⅓rd increase in Y↔2 space	*Polysiphonia fibrata*
	209	2	2	No signature	No signature	*Polysiphonia violacea*
	210	2	2	No signature	No signature	*Chylocladia parvula*
36.	211	2	4	Vol. II. Z	'Vol. II.' as before; 'Z' shifted right	*Porphyra vulgaris*
	212	2	3	Z2	Position shifted right; spaced out	*Callithamnion pedicellatum*
	213	2	4	No signature	No signature	*Hormospora ramosa*
	214	2	3	No signature	No signature	*Griffithsia corallina*
	215	2	3	Vol. II. 2A	'Vol. II.' as before (left text); '2A' position shifted right	*Ceramium botryocarpum*
	216	2	4	2 A 2	Shifted right; position of characters closed slightly	*Cladophora falcata*
37.	217	2	2	No signature	No signature	*Rhodymenia palmata*
	218	2	2	No signature	No signature	*Rhodymenia palmata*
	219	2	3	Vol. II. 2B	'Vol. II.' down slightly; '2B' shifted right	*Ceramium deslongchampii*
	220	2	2	2 B 2	Position shifted right	*Rytiphlaea fruticulosa*
	221	2	2	No signature	No signature	*Rytiphlaea thuyoides*
	222	2	2	No signature	No signature	*Corallina officinalis*
38.	223	2	1	Vol. II. 2C	'Vol. II.' lowered slightly; '2C' shifted right	*Laminaria digitata*
	224	2	2	2 C 2	Position shifted right	*Dasya arbuscula*
	225	2	2	No signature	No signature	*Dasya venusta*
	226	2	4	No signature	No signature	*Ochlochaete Hystrix*
	227	2	2	Vol. II. 2D	'Vol. II.' as before; '2D' shifted right	*Polysiphonia subulifera*
	228	2	2	2 D 2	Position shifted right	*Polysiphonia griffithsiana*
39	229	2	1	No signature	No signature	*Fucus canaliculatus*
	230	2	3	No signature	No signature	*Callithamnion roseum*
	231	2	3	Vol. II. 2E	'Vol. II.' as before; '2E' shifted right	*Callithamnion polyspermum*

Number in Synopsis	Textual differences between A↔B/C
186	'2' (A)→'2' (B); 'Danm.' (A)→'Damn.' (B); '*Algier.*' (A)→'*Alg.*' (B); &c. (A)→etc. (B); punctuation differences (B).
231	Punctuation differences and line-end shifts (B); Greek script larger (B); opaque (A)→opake (B); muscle (A)→mussel (B).
306	Punctuation and typeface changes (B); lowercase to CAP changes (B); Greek script larger (B); 'Danm. no.' (A)→Damn. n. (B).
109	'2' (A)→'2' (B); continent (A)→Continent (B); Danm. (A)→Damn. (B); muscle (A)→mussel (B); Greek script larger (B).
115	Greek script larger (B); punctuation differences and line-end shifts (B); decomposed (A)→decompound (B); 2 (A)→2 (B); Danm. (A)→Damn. (B).
145	Punctuation differences (B); Greek script larger (B); Danm.→Damn. (B).
344	Typeface, spelling and punctuation differences (B); line-end changes (B); Greek script larger (B); Danm. (A)→Damn. (B).
273	Line-end shifts and punctuation changes (B); Greek script larger (B); &c. (A)→etc. (B); *Supp.* (A)→*Suppl.* (B); 2 (A)→2 (B).
388	Line-end and punctuation changes (B); Greek script larger (B); extra abbreviations (B).
244	Punctuation and typeface changes (B); 2 (A)→2 (B); *Supp.* (A)→*Suppl.* (B).
227	Respacings (B); Greek script larger (B); Descpn, line 6—not (A)→nor (B); Descpn, penultimate line, reverse, not (A)→no (B).
309	Line-end shifts, punctuation changes and spacing variations (B); Greek script larger (B).
183	Line-end shifts, punctuation changes and script-size changes (A→B); Greek script larger (B); 2 (A)→2 (B); Danm. (A)→Damn. (B); *soboliferus* ref. (reverse) to Harvey 'Tab. . . . CCXVIII. fig. 2' (A)→'Tab. . . . CCXXVIII. fig. 2' (B).
183 bis	Line-end shifts and punctuation changes (B).
229	Line-end shifts and punctuation changes (B); Greek script larger (B).
105	Last line face taken over to reverse (B); line-end shifts and punctuation changes (B); Greek script larger (B).
104	Line-end shifts (B); Greek script larger (B); Descpn, hog's (A)→hogs' (B); line 3, reverse, frond (A)→front (B).
147	Line-end shifts and punctuation changes (B); legend, 2 (A)→2 (B); Descpn, hog's (A)→hogs' (B).
24	Line-end shifts, punctuation changes and typeface changes (B).
132	Line-end shifts and punctuation changes (B); Greek script larger (B); 2 (A)→2 (B); hog's (A)→hogs' (B).
133	Line-end shifts, punctuation changes and typeface changes (B); Greek script larger (B); 2 (A)→2 (B); hog's (A)→hogs' (B).
329	Typeface changes and line-end changes (B); spacing variations (B); Greek script larger (B).
124	Typeface changes, punctuation changes and line-end shifts (B); Greek script larger (B); line 3, base, face, specimen (A)→specimens (B).
112	Line-end shifts and typeface changes (B); Greek script larger (B); 2 (A)→2 (B).
15	Line-end shift (last line of comments; B); Greek script larger (B); Velley (synonymy; A)→Velly (B); Arabic figs (A)→Roman figs (B).
261	Line-end shifts, punctuation changes and typeface changes (B); Greek script larger (B).
263	Greek script larger (B); Grevillii (reverse; A)→Crevillii (B); 2 (A)→2 (B), in signature.

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
	232	2	3	2 E 2	Position shifted right	*Gigartina pistillata*
	233	2	1	No signature	No signature	*Ectocarpus landsburgii*
	234	2	2	No signature	No signature	*Jania corniculata*
40.	235	2	2	Vol. II. 2F	'Vol. II.' as before; '2F' shifted right	*Nitophyllum Gmelinii*
	236	2	4	2 F 2	shifted right; characters closed up	*Cladophora repens*
	237	2	1	No signature	No signature	*Stilophora lyngbyaei*
	238	2	4	No signature	No signature	*Rhizoclonium riparium*
	239	2	4	Vol. II. 2G	No signature	*Rivularia atra*
	240	2	1	2 G 2	No signature	*Elachistea fucicola*
41.	241	3	1	Vol. III. B	No signature	*Laminaria bulbosa*
	242	3	3	B2	No signature	*Callithamnion Plumula*
	243	3	4	Vol. III. C	'Vol. III.' slightly raised; 'C' raised & shifted very slightly	*Ulva lactuca*
	244	3	3	C2	Shifted right	*Dudresnaia coccinea*
	245	3	4	No signature	No signature	*Enteromorpha ramulosa*
	246	3	4	No signature	No signature	*Bangia (?) elegans*
42.	247	3	2	Vol. III. D	'Vol. III.' as before; 'D' shifted right	*Delesseria alata*
	248	3	1	D2	Position shifted right; closed slightly	*Punctaria tenuissima*
	249	3	4	No signature	No signature	*Microcoleus anguiformis*
	250	3	2	No signature	No signature	*Hildenbrandia rubra*
	251 [A; B; C]	3	4	Vol. III. E	No signature	A. *Oscillatoria nigroviridis* B. *Oscillatoria subuliformis* C. *Oscillatoria insignis*
	252	3	2	E2	No signature	*Jania rubens*
43.	253	3	2	No signature	No signature	*Dasya coccinea*
	254	3	4	No signature	No signature	*Calothrix confervicola*
	255	3	3	Vol. III. F	In same positions (all)	*Ceramium fastigiatum*
	256	3	4	F2	Position shifted right	*Monormia intricata*
	257	3	1	No signature	No signature	*Ectocarpus fenestratus*
	258	3	1	No signature	No signature	*Ectocarpus longifructus*
44.	259	3	2	Vol. III. G	In same positions (all)	*Delesseria sinuosa*
	260	3	1	G2	No signature	*Elachistea flaccida*
	261	3	1	No signature	No signature	*Elachistea stellulata*
	262	3	3	No signature	No signature	*Callithamnion byssoideum*
	263	3	4	Vol. III. H	No signature	*Enteromorpha Hopkirkii*
	264	3	2	H2	No signature	*Rhodomela subfusca*

Number in Synopsis	Textual differences between A↔B/C
193	Line-end shifts, punctuation changes (B); Greek script larger (B); 2 (A)→2 (B); 1800 (A; records)→1809 (B; records); Linn. (A)→Lynn. (B); Stackhouse (A)→Stockhouse (B).
89	Line-end shifts (B); transpositions (B); Greek script larger (B); CAPS (A)→lower-case (B).
151	Line-end shifts and punctuation changes (B).
172	Line-end shifts and punctuation changes (B); Greek script larger (B); 2 (A)→2 (B); Lamouroux ref. 'p. 36' (A)→'p. 63' (B).
290	Line-end shifts and typeface changes (B); Greek script larger (B); 'Alg.' omitted from 'J.Ag.Alg. Medit.' (B); Line 3, Comments, 'a' omitted (B).
40	line-end shifts and punctuation changes (B); typeface changes (B); Greek script larger (B).
314	Line-end shifts (B); Greek script larger (B); *Dillw. Conf.* (A)→Dillw. Conf. (B).
351	—
59	Greek script larger (B); Danm. (A)→Damn. (B).
25	Danm. (A)→Damn. (B).
249	Punctuation changes (B); ! ends comments text (A)→. ends comments text (B); Greek script larger (B).
341	Division line changes (A→B); line 2, synonymy, 'part.' (A)→'part' (B).
220	Line-end shifts and punctuation changes (B); 2 (A)→2 (B); Fig. legend 2 (error; A)→3 (correct; B).
336	Greek script larger (B); punctuation changes (B); HAB. misaligned vertically (B).
349	Heads DISTR. and DESCR. correct in A, transposed in B; line 3 from base, face side, difference (A)→ differences (B); punctuation changes (B).
165	2 (A)→2 (B); Lightf. syn. 'p. 951' (A)→'957' (B); line-end shifts, typeface and punctuation changes (B).
45	Punctuation and typeface changes (B); J. Ag. (A)→J. Alg. (B).
371	Greek script larger and *with* accents (B); punctuation changes (B); inclosed (Descpn; A)→enclosed (B).
161	Kützing Phyc. Gen. ref. 'p. 384' (A)→'p. 304' (B); punctuation changes (B); Hildenbrandia (A, on reverse)→Hildenbrandtiae (B).
375 376 377	—
150	Wavy division line angled up to right (A)→not so (in B); italic larger and more spaced (B).
130	Punctuation changes (B); typefaces changes (B), CAP→lower-case (B); Greek script larger (B).
356	Line-end shifts (B); Greek script larger, *with* accents (B); hyphens inserted (B).
234	Wyatt Danm. (A)→Damn. (B); Lower-case to CAP changes (B); line-end shifts (B); Greek script larger (B).
380	Line-end shifts and punctuation changes (B); Greek script larger (B), *with* accents added (B); of (comments; A)→ to (comments; B); DESCR. in error for DISTR. (B).
82	Greek script larger, *with* accents (B); punctuation changes (B); line level shifts (B).
91	Greek script larger, *with* accents (B); line length changes (division lines) (B).
164	Line-end shifts and punctuation changes (B); 2 (A)→2 (B).
60	Greek script larger, *with* accents (B); Danm. (A)→Damn. (B).
62	Greek script larger, *with* accents (B); 'Gen.' and 'et' reversed (synonymy; A); punctuation changes (B).
262	Line-end shifts, punctuation and typeface changes (B); Greek script larger (B); 'la' omitted (B) from the correct 'articulations' in legend (A); 'C. byssoideum' (reverse comments; A)→'E. byssoideum' (in error; B); Harvey Man. ed.1 (A)→Harvey Man. ed. (B).
337	—
100	Line-end shifts and spacing changes (B); Greek script larger (B); 2 (A)→2 (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
45.	265	3	1	No signature	No signature	*Cystoseira ericoides*
	266	3	3	No signature	No signature	*Gigartina Teedii*
	267	3	2	Vol. III. H	No signature	*Nitophyllum laceratum*
	268	3	4	H2	No signature	*Conferva bangioides*
	269	3	3	No signature	No signature	*Callithamnion thuyoideum*
	270	3	1	No signature	No signature	*Litosiphon pusillus*
46.	271	3	1	Vol. III. K	'Vol. III.' as before; 'K' shifted right	*Fucus ceranoides*
	272	3	3	K2 ([central])	Shifted markedly right	*Callithamnion corymbosum*
	273	3	1	No signature	No signature	*Ectocarpus fasciculatus*
	274	3	3	No signature	No signature	*Callithamnion arbuscula*
	275	3	4	Vol. III. L	'Vol. III' as before; 'L' shifted right	*Cladophora albida*
	276	3	3	L2	Slight shift right (1½ ms) of A over B (B is *left* of A)	*Ceramium decurrens*
47	277	3	2	No signature	No signature	*Polysiphonia nigrescens*
	278	3	2	No signature	No signature	*Polysiphonia simulans*
	279	3	3	Vol. III. M	'Vol. III.', one 'm' right (A); 'M' firm shift right (B)	*Callithamnion Hookeri*
	280	3	1	M2	Position shifted right	*Myrionema strangulans*
	281	3	3	No signature	No signature	*Griffithsia barbata*
	282	3	4	No signature	No signature	*Enteromorpha Ralfsii*
48.	283	3	2	No signature	No signature	*Chylocladia articulata*
	284	3	2	No signature	No signature	*Polysiphonia byssoides*
	285	3	1	Vol. III. N	No signature	*Chorda lomentaria*
	286	3	2	N2	No signature	*Laurencia caespitosa*
	287	3	3	No signature	No signature	*Griffithsia simplicifilum*
	288	3	3	No signature	No signature	*Gymnogongrus plicatus*
49	289	3	1	Vol. III. O	'Vol. III.' as before; 'O' shifted right; both lowered one mm.	*Laminaria saccharina*
	290	3	4	O2	Position shifted right	*Codium Bursa*
	291	3	2	No signature	No signature	*Melobesia calcarea*
	292	3	2	No signature	No signature	*Polysiphonia elongata* (Yr1)
	293	3	2	Vol. III. P	'Vol. III.' as before; 'P' shifted right	*Polysiphonia elongata* (Yr2)
	294	3	4	P2	Position shifted right	*Cladophora fracta*

Number in Synopsis	Textual differences between A↔B/C
4	Line-end shifts, punctuation and typeface changes (B); Greek script larger, with accents added (B).
195	Greek script larger (B); 'doubly' (mid-Descpn; A)→'double' (in error; B).
173	Line-end shifts (B); No. (Wyatt; A)→no. (B); Greek script larger (B).
326	—
270	Punctuation changes (B); Greek script larger (B); Danm. (A)→Damn. (B); Mc.Calla (A)→M^{c}Calla (B).
49	Punctuation changes (B); Greek script larger, with accents added (B); 'v' omitted from Harv. (heading; A); Danm. (A)→Damn. (B); 'these' (Descpn; A)→'the' (B).
11	Greek script larger (B); Danm. (A)→Damn. (B).
271	Line-end shifts (B); Head and pl. no. reversed (A); Greek script larger (B); 2 (A)→2 (B); Danm. (A)→Damn. (B); 'Cal.' (A)→'C' (in comments; B).
83	Greek script larger, with accents added (B); line-end shifts (B); Danm. (A)→Damn. (B); Lam. (A)→Laminaria (B), reverse text.
255	Typeface (CAP/lower-case) changes (B); punctuation changes and line-end shifts (B); Greek script larger (B); 2 (A)→2(B); 'Cal.' (A; comments)→'C' (B).
304	—
228	Greek script larger (B); 2 (A)→2 (B).
122	Typeface and punctuation changes (B); Greek script larger (B); Danm. no. (A)→Damn. n. (B); Dillw. no. (A)→Dillw. n. (B).
121	Punctuation changes (B); Greek script larger, with accents added (B).
260	Punctuation changes (B); Greek script larger, with accents added (B); Dan. No. (A)→Damn. n. (B).
66	Line-end shifts and division line changes (B); Greek script larger, with accents added (B).
242	Line-end shifts (Descpn; B).
339	Division line changes (B); Greek script larger, with accents added (B).
146	Line-end shifts and punctuation changes (B); Greek accents added (B); 2 (A)→2 (B); Danm. no. (A)→Damn. n. (B).
129	Typeface and punctuation changes (B); Greek accents added (B); Danm. no. (A)→Damn. n. (B); etc. (Comments; A)→&c. (B).
31	Greek var. letters larger in synonymy (B); Danm. (A)→Damn. (B); portion (legend; A)→portions (B).
136	Punctuation changes (B); Danm. (A)→Damn. (B).
241	Typeface and punctuation changes (B); 2 (A)→2 (B).
205	Typeface changes and line-end shifts (B); Greek script larger, with accents added (B); Danm. (A)→Damn. (B).
27	Punctuation changes (B); terminal line raised (B); Danm. (A)→Damn. (B); '*Angl.*' (Hudson; A)→'*Ang.*' (B).
280	Greek script larger, with accents added (B); punctuation changes (B).
153	Punctuation changes and line-end shifts (B); terminal line absent (B).
114	Line-end shifts (B); Greek script larger, with accents added (B); Danm. (A)→Damn. (B); 2 (A)→2 (B); 'jonits' (A; line 1)→'joints' (B; line 1); Alg. Medit. ref., p. 136 (A)→137 (B); 'chalarophlaea' (A)→'chalarophloea' (B).
114	Typeface and punctuation changes (B).
313	Line-end shifts and punctuation changes (B); Greek script larger, with accents added (B); Danm. no. (A)→ Damn. n. (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
50.	295	3	1	No signature	No signature	*Litosiphon laminariae*
	296	3	3	No signature	No signature	*Callithamnion Pluma*
	297	3	3	Vol. III. Q	'Vol. III.' as before; 'Q' shifted right	*Callithamnion sparsum*
	298	3	4	Q2	Position shifted right	*Cladophora flavescens*
	299	3	2	No signature	No signature	*Polysiphonia fastigiata*
	300	3	4	No signature	No signature	*Lyngbya ? flacca*
51.	301	3	2	Vol. III. R	'Vol. III.' as before; 'R' shifted right	*Chrysymenia rosea* var. *orcadensis*
	302	3	2	R2	Shifted right	*Polysiphonia fibrillosa*
	303	3	2	No signature	No signature	*Polysiphonia affinis*
	304	3	4	No signature	No signature	*Enteromorpha cornucopiae*
	305	3	4	Vol. III. S	'Vol. III.' as before, but spaced; 'S' shifted right	*Calothrix caespitula*
	306	3	4	S2	V. slight shift left *cf.* A; '2' moved left more than 'S'	*Calothric hydnoides*
52.	307	3	2	No signature	No signature	*Rhodymenia cristata*
	308	3	3	No signature	No signature	*Callithamnion fasciculatum*
	309	3	4	Vol. III. T	'Vol. III.' slight shift right; 'T' shifted right more	*Calothrix semiplena*
	310	3	3	T2	Shifted right	*Phyllophora palmettoides*
	311	3	4	No signature	No signature	*Lyngbya ferruginea*
	312	3	1	No signature	No signature	*Desmerestia viridis*
53.	313	3	3	Vol. III. U	'Vol. III.' very slight shift *left*; 'U' shift right	*Callithamnion virgatulum*
	314	3	3	U2	Shifted right	*Callithamnion Daviesii*
	315	3	4	No signature	No signature	*Rivularia plicata*
	316	3	4	No signature	No signature	*Schizosiphon warreniae*
	317	3	4	Vol. III. X	'Vol. III.' same posn., 'X' shifted right Caps slightly larger;	*Bangia ? ceramicola*
	318	3	1	X2	Position shifted right	*Mesogloia griffithsiana*

Number in Synopsis	Textual differences between A↔B/C
50	Division line changes (B); Greek script larger, with accents added (B).
254	Line-end changes (B); Greek script larger, with accents added (B).
277	Line-end changes (B)) punctuation and typeface changes (B); Greek script larger, with accents added (B).
312	Line-end shifts and punctuation changes (B); Greek script larger, with accents added (B); 'pars' (synonymy; A)→'part' (B).
127	Greek script larger, with accents added (B); typeface changes (B); Danm. (A)→Damn. (B).
369	Division line limit changes (B); Italic script larger, more spaced out (B).
141	Line-end and punctuation changes (B); Greek script larger, with accents added (B).
117	Typeface changes (B); Greek script larger, with accents added (B); Danm. no. (A)→Damn. n. (B).
123	Line-end shifts and punctuation changes (B); Greek script larger (B); &c. (A)→etc. (B).
330	Punctuation changes (B); Greek script larger, with accents added (B); &c. (Habitat; A)→etc. (B).
364	Division line changes (B); Greek script larger, with accents added (B).
363	Division line changes (B); Greek script larger, with accents added (B).
180	Line-end shifts and punctuation changes (B); Greek script larger, with accents added (B); 2 (A)→2 (B); MacBain (A)→M^{c}Bain (B).
265	Punctuation changes and line-end shifts (B); Greek script larger, with accents added (B).
362	Punctuation changes (B); Greek script larger, with accents added (B); No. (synonymy; A)→n. (B); MS (A)→ms (B).
202	Typeface changes (CAP to lower-case) (B); punctuation changes (B); Greek accents added (B); Danm. no. (A)→Damn. n. (B).
366	Line-end shifts and punctuation changes (B); Division line level changes (B); MSS and MS (synonymy; A)→ mss and ms (B).
19	Line-end shifts and punctuation changes (B); Danm. No. (A)→Damn. n. (B).
279	Line-end shifts and punctuation changes (B); Greek script larger, with accents added (B); tetraspores (A)→ tetraaspores (B); Cal. (legends; A)→C. (B); Danm. no. (A)→Damn. n. (B).
278	Line-end shifts, punctuation changes and typeface changes (B); Greek script larger, with accents added (B); Callithamnion (legend; A)→C. (B); Cal. (A)→C. (B); Spec. Alg. (A)→Sp. Alg. (B).
350	Division line level, spacing and punctuation changes (B).
354	Division line level changes (B); Greek script larger, with accents added (B); '*Casp.*' (Authority, heading; A)→ '*Cusp.*' (B).
347	Punctuation changes and line-end shifts (B); form of '?' with basal up-curve (B); *Bangia* (comments; A)→B. (B).
54	Division line level changes (B); Greek script larger, with accents added (B); MS (A)→ms (B); Danm. no. (A)→Damn. n. (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
54.	319	3	2	No signature	No signature	*Polysiphonia carmichaeliana*
	320	3	2	No signature	No signature	*Polysiphonia spinulosa*
	321	3	4	VOL. III. Y	'VOL. III.' shifted v. slightly *left*; 'Y' shifted right	*Vaucheria velutina*
	322	3	4	Y2	Position shifted right	*Bangia ciliaris*
	323	3	1	No signature	No signature	*Elachistea scutulata*
	324	3	1	No signature	No signature	*Leathesia tuberiformis*
55.	325	3	3	VOL. III. Z	No signature	*Callithamnion mesocarpum*
	326	3	1	Z2	No signature	*Dictyosiphon foeniculaceus*
	327	3	4	No signature	No signature	*Conferva collabens*
	328	3	4	No signature	No signature	*Cladophora Youngana*
	329	3	1	VOL. III. 2A	'2A' shifted right; 'VOL. III.' very slightly narrowed	*Ectocarpus distortus*
	330	3	1	2 A 2	Position shifted right	*Ectocarpus crinitus*
56.	331	3	3	No signature	No signature	*Callithamnion affine*
	332	3	1	No signature	No signature	*Elachistea curta*
	333	3	4	VOL. III. 2B	'VOL. III.' as before; '2B' shifted right	*Conferva litorea*
	334	3	3	2 B 2	Shifted right	*Ceramium strictum*
	335	3	4	No signature	No signature	*Enteromorpha compressa*
	336	3	4	No signature	No signature	*Lyngbya (Hormotrichum) Cutleriae*
57.	337	3	3	VOL. III. 2C	'VOL. III.' as before; '2C' shifted right	*Gelidium cartilagineum*
	338	3	1	No signature	No signature	*Laminaria digitata* var. *stenophylla*
	339	3	1	No signature	No signature	*Laminaria longicruris*
	340	3	4	No signature	No signature	*Enteromorpha clathrata*
	341	3	1	VOL. III. 2D	'VOL. III.' opened slightly; '2D' shifted right, narrowed	*Zonaria parvula*
	342	3	4	No signature	No signature	*Calothrix luteola*

Number in Synopsis	Textual differences between A↔B/C
116	Line-end shifts (B); Greek script larger, with accents added (B); 2 (A)→2 (B); MS (A)→ms (B).
110	Line-end shifts and punctuation changes (B); Greek script larger, with accents added (B); 2 (A)→2 (B).
288	Division line level changes (B); italic script larger, more spaced out (B).
346	Line-end shifts (B); MSS (synonymy; A)→mss (B); *Bangia* (legend and comments; A)→*B.* (B).
63	Punctuation changes (B); Greek script larger, with accents added (B); Danm. no. (A)→Damn. n. (B); &c. (legend; A)→etc. (B).
56	Line-end shifts and punctuation changes (B); *Alg.* (synonymy; A)→*Ag.* (B); Danm. no. (A)→Damn. n. (B); *Muck.* (A)→*Mack.* (B).
276	Line-end shifts (B); Greek script larger, with accents added (B).
41	Greek script larger, with accents added (B); Danm. (A)→Damn. (B).
325	Punctuation changes (B); Greek script larger in vars (B); 'and' and 'all' (correctly placed in legend; A)→ transposed in B.
327	Punctuation changes and division line shifts (B); italic larger and spaced out (B).
88	Line-end shifts and division line level changes (B); Greek script larger, with accents added (B); MSS (synonymy; A)→mss (B).
86	Line-end shifts and division line level changes (B); Greek script larger, with accents added (B); MSS (synonymy; A)→mss (B).
267	Punctuation changes and line-end shifts(B); Greek script larger, with accents added (B).
61	Greek script larger, with accents added (B); italic larger and spaced out (B); '*Brit.*' (synonymy; A)→'*Br.*' (B).
318	Danm. No. (A)→Damn. n. (B); line-end shifts (B); 'curled' (Descpn; A)→'curved' (B).
232	Line-end shifts and punctuation changes (B); Greek script larger, with accents added (B); &c. (A)→etc. (B).
332	Danm. No. (A)→Damn. n. (B); punctuation changes (B); Greek script larger, with accents added (B); &c. (A)→etc. (B).
370	Division line level changes (B); italic script larger and more spaced out (B); DESCR. (A)→DESC. (B).
192	Line-end shifts (B); type-face changes (B).
24*	[See also 223.] Punctuation and typeface changes (B); division line level changes (B).
26	Line-end shifts (B); italic script larger and more spaced out (B); spacing changes in the arrangement of initials 'W.H.H.' (B).
335	Punctuation changes (B); Greek script larger, with accents added (B); Danm. No. (A)→Damn. n. (B); *Ent.* (Comments; A)→*E.* (B).
36	Line-end shifts (B); Greek script larger, with accents added (B); misaligned type (Descr.; B); italic larger and spaced out (B).
358	Punctuation changes (B); Greek script larger, with accents added (B); MSS (synonymy; A)→mss (B); Helgoland (A)→Heligoland (B).

No. (Part)	Pl No.	Vol. in Primary (3-Vol.) numbered version	Vol. in Synoptic (4-Vol.) version	Basal signatures, version A of text	Differences, basal signatures, versions B/C compared with A	Species name (Harvey application)
58.	343	3	1	No signature	No signature	*Sargassum vulgare*
	344	3	4	No signature	No signature	*Enteromorpha Linkiana*
	345	3	2	Vol. III. 2E	'Vol. III.' shifted right; '2E' shifted right	*Melobesia polymorpha*
	346	3	2	No signature	No signature	*Melobesia lichenoides*
	347 [A; B; C; D]	3	all 2	No signature	No signature	*Melobesia* A. *membranacea* B. *farinosa* C. *verrucata* D. *pustulata*
	348	3	1	No signature	No signature	*Myrionema clavatum*
59.	349	3	1	Vol. III. 2F	'Vol. III.' as before (but spaced) '2F' shifted right and spaced differentially	*Sphacelaria racemosa*
	350 [A; B]	3	4	No signature	No signature	A. *Vaucheria marina* B. *Vaucheria submarina*
	351	3	4	No signature	No signature	*Cladophora nuda*
	352	3	4	No signature	No signature	*Enteromorpha percursa*
	353	3	4	Vol. III. 2G	'Vol. III.' as before; '2G' shifted right	*Cladophora flexuosa*
	354 [A; B]	3	4	No signature	No signature	A. *Conferva arenicola* B. *Rhizoclonium Casparyi*
60.	355 [A; B]	3	4	No signature	No signature	A. *Cladophora Magdalenae* B. *Cladophora Gattyae*
	356	3	4	No signature	No signature	*Cladophora Balliana*
	357 [A; B]	3	3	Vol. III. 2H	'Vol. III.' position same, but closed spatially; '2H' position same, but closed spatially	A. *Furcellaria fastigata* B. *Dumontia filiformis*
	358 [A; B]	3	2	No signature	No signature	A. *Chrysymenia rosea* B. *Chylocladia kaliformis*
	359	3	1	No signature	No signature	*Zonaria collaris*
	360	3	1	No signature	No signature	*Cystoseira barbata*

Number in Synopsis	Textual differences between A↔B/C
1	Terminal division line level change (B); italic script larger and more spaced out (B).
333	Terminal division line level change (B); italic script larger and more spaced out (B); Greek script larger, with accents added (B).
152	Punctuation changes (B); line-end shifts (B); Dalkey (A)→Dalky (B).
156	Line-end shifts (comments; B).
157	Line-end shifts (B); punctuation changes (B).
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69	Punctuation changes (legend; B); spacing changes (B); Greek script larger, with accents added (B); *Sp.* (correctly, in synonymy; A)→*Syst.* (B).
79	Punctuation changes and line-end shifts (B); Greek script larger, with accents added (B); 'height' (Descpn; A)→'eight' (B).
287	Danm. (Wyatt; A)→Damn. (B).
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296	Punctuation and spacing changes (B); Greek script larger, with accents added (B).
338	Punctuation changes and line-end shifts (B); Greek script larger, with accents added (B); italic script larger, more spaced out (B).
299	Danm. (Wyatt; A)→Damn. (B).
316	Division line variations (B); italic script larger, more spaced out (B).
315	Division line variations (B); line-end shifts (B).
310	Division line variations (B); line-end shifts (B); Greek script larger, with accents added (B).
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301	Division line variations (B); line-end shifts (B); Greek script larger, with accents added (B); &c. (A)→etc. (B).
207	Line and word spacing tightened (B).
208	
141	Punctuation and spacing changes (B).
143	Line-end shifts and punctuation changes (B); typeface changes (CAP→lower-case) (B).
5	Line-end shifts (B); Greek script larger, with accents added (B); [Mont. Alger.] 'No.' (A)→'n.' (B).
	Division line level changes (B); line-end shifts (B); punctuation changes (B); Greek script larger, with accents added (B).

Appendix I

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(with geographical subdivision according to places connected with them)

[Numbers used refer to the plate numbers in the numerical sequence version]

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Appendix II

Index to geographical locations named in *Phycologia Britannica* . . .

Notes:

1. Numbers given after the geographical location indicate the plate numbers for which the texts mention that location.
2. For British counties named, nomenclature and boundaries as before the reorganisation on 1 April 1974 are employed since that state is much nearer the arrangement as it would have been in Harvey's working life.
3. Cross-references are presented to make the list more effective.

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  Cable Island, near: 101. See also Cork; Waterford.

Appendix III

The published reviews

(1) Page 201 *The Gardener's Chronicle* **1846** (No. 11) pp. 166–167, Sat., 14 March 1846.

(2) Page 202 *The London Journal of Botany*, **5**: 245, 1846.

(3) Page 203 *The Witness, Edinburgh*, Wednesday, 18 March 1846.

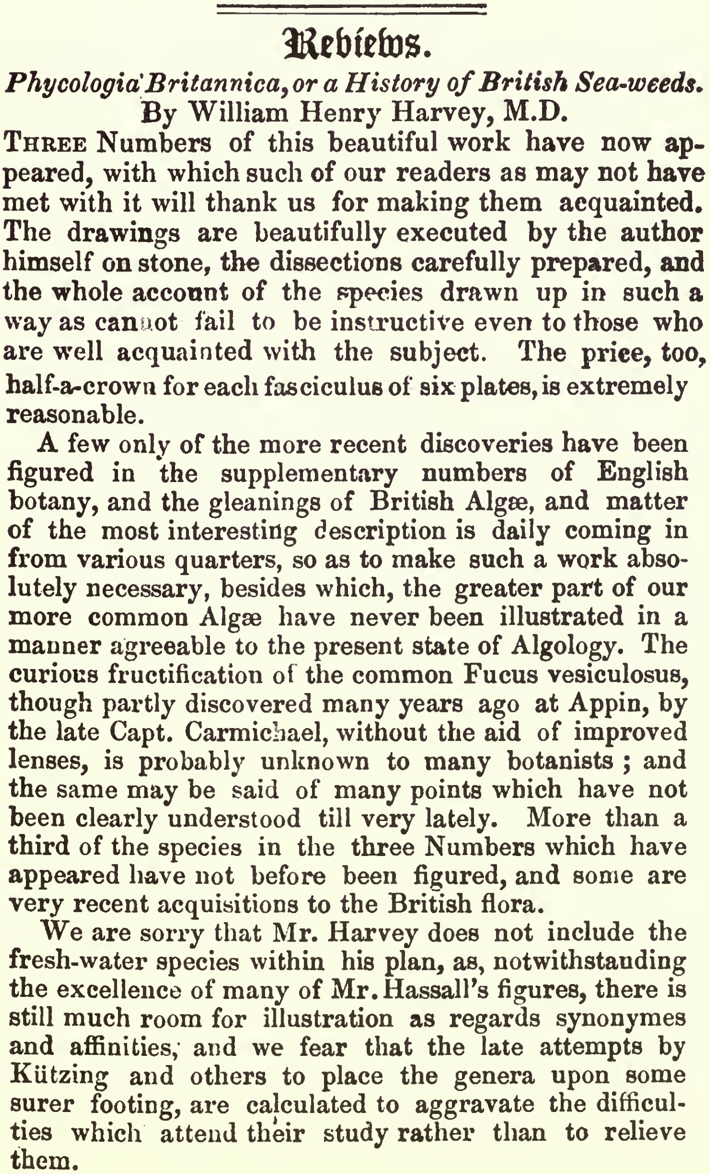
(4) Page 204 *Revue Botanique (Duchartre)* **1**: 412–414, 1846.

(5) Page 205 *Annals Mag. Nat. Hist.* **17** (No. 114): 429–431. June 1846.

(6) Page 206 *The Athenaeum* 1847 (1009): 229, 27/2/1847.

(7) Page 207 *Botanische Zeitung* **5** (9): 143–146, 1847. Review by Kützing.

(8) Page 208 Advertisement from *The Athenaeum* (**1846** (963): 364, Sat. 11 April 1946) for *Phycologia Britannica*, quoting the thus-far untraced review in *Saunders's Newsletter* of 1846. The latter publication has been checked for the supposed review, without success.



Reviews.

Phycologia Britannica, or a History of British Sea-weeds.
By William Henry Harvey, M.D.

THREE Numbers of this beautiful work have now appeared, with which such of our readers as may not have met with it will thank us for making them acquainted. The drawings are beautifully executed by the author himself on stone, the dissections carefully prepared, and the whole account of the species drawn up in such a way as cannot fail to be instructive even to those who are well acquainted with the subject. The price, too, half-a-crown for each fasciculus of six plates, is extremely reasonable.

A few only of the more recent discoveries have been figured in the supplementary numbers of English botany, and the gleanings of British Algæ, and matter of the most interesting description is daily coming in from various quarters, so as to make such a work absolutely necessary, besides which, the greater part of our more common Algæ have never been illustrated in a manner agreeable to the present state of Algology. The curious fructification of the common Fucus vesiculosus, though partly discovered many years ago at Appin, by the late Capt. Carmichael, without the aid of improved lenses, is probably unknown to many botanists ; and the same may be said of many points which have not been clearly understood till very lately. More than a third of the species in the three Numbers which have appeared have not before been figured, and some are very recent acquisitions to the British flora.

We are sorry that Mr. Harvey does not include the fresh-water species within his plan, as, notwithstanding the excellence of many of Mr. Hassall's figures, there is still much room for illustration as regards synonymes and affinities, and we fear that the late attempts by Kützing and others to place the genera upon some surer footing, are calculated to aggravate the difficulties which attend their study rather than to relieve them.

Phycologia Britannica; or *History of the British Seaweeds*, by W. H. Harvey, M.D. M.R.I.A., &c., &c.

Four numbers of this beautiful work are already before the public, and the judgment of that public has been pronounced upon it. We believe of its merits there can be but one opinion, viz. that at no period of botanical literature has a more important contribution been made to the Flora of the British Isles than on the present occasion. Of Dr. Harvey's fitness for the descriptive portion of the work, a moment's doubt could not be entertained; but it adds infinitely to the value of the plates, to know that not only are the drawings and analysis all executed by Mr. Harvey's own hands, but the plates (lithographs) also; thus ensuring the most perfect accuracy to the figures, as well as the letter-press. The work will be completed in sixty numbers, and each number contains six coloured plates, at the moderate price of 2*s.* 6*d.*. These appear without reference to systematic order, but at the conclusion of each volume, and more fully at the completion of the entire work, systematic and alphabetical indexes will be added; and finally a general introduction, to be prefixed to the last volume, will complete the history. The plates represent the natural size and magnified dissections of the species, accompanied by generic and specific characters, synonyms, British habitats, the geographical distribution and general history of each individual, in a fuller and more perfect manner, than has yet been attempted in any work exclusively devoted to the illustration of British Algæ.

We heartily wish it all the success so useful a publication merits.

Parts I., II., III., Phycologia Britannica; or, History of British Seaweeds, containing Coloured Figures, Generic and Specific Characters, Synonyms, and Descriptions of all the species of Algæ inhabiting the shores of the British Islands. By William Henry Harvey, M.D., M.R.S.A., Keeper of the Herbarium of the University of Dublin. London: Reeve, Brothers, King William Street, Strand.

We have now in our possession the first three parts of what will form one of the most magnificent works ever published in any department of natural science. From these instalments we clearly see what a treasure the whole work will be. It is a most happy combination of science and art, with elegance and beauty.

Since Dr Greville, who has done so much for marine botany, seems to have no intention of going on with his admirable *Algæ Britannicæ*, how fortunate is it that the crimson and green mantle of Phycology has descended on shoulders from which it flows in such graceful folds. Before the appearance of any portion of this work, there could be but one opinion, from what he has already done, of Dr Harvey's thorough fitness for the letter-press department. Happy are we to find that his pencil is not less felicitous than his pen. The drawings,—admirably true to nature,—are executed in a most masterly and tasteful style; and well is it that this work has fallen into the hands of Mr Reeve, who has done great justice to the letter-press part of the work, and whose coloured plates are truly exquisite. It is impossible even for those who are ignorant of algology to look at the plates without great delight. To those who have made any progress in the study, the work will be the richest treat. It furnishes every thing they could desire to help them on. The figures of the natural size are exceedingly like; and the magnified portions of the fructification of the frond, and of the stem, &c., will be of the greatest possible service. A glance at these figures will impart more knowledge of the plants than could be communicated by the most accurate description in words.

> "Segnius irritant animos demissa per aurem
> Quam quæ sunt oculis subjecta fidelibus," &c.

We approve of his plan of giving a specimen in the first volume of each of the genera, as in this way the student will have great help afforded him while the work is going on. There are to be sixty monthly parts, and every part is to have six splendid plates. Some of those already published were new to Britain. We never weary looking at them. We remember reading, long ago, of Proteus driving his marine herds, during Deucalion's flood, to visit the lofty mountains. We have here Flora's marine beauties,—not transplanted to the cold mountain-side,—but brought to our drawing-room tables, and to our comfortable firesides. Look at that *Calithamnion gracillimum*—that fern-leaf, as Mrs Griffiths calls it. How exceedingly graceful it is! Or turn to that lovely *Griffithsia Devenensis*, respecting which the author says, "This graceful little plant, which appears different from all the species of *Griffithsia* yet described, was discovered, in the summer of 1840, by the Rev. Mr Hore, at Plymouth, and, in he autumn of the same year, added to the flora of Devonshire by Mrs Wyatt. I record this latter habitat in he specific name, because it affords me an opportunity, of which I fondly avail myself, to connect the name of Mrs Griffiths with that of the county whose shores she has so long and so successfully explored, where the best part of her life has been spent, and the natural history of which, in all its varied branches, her researches have so greatly advanced." Or, do you prefer green to crimson? What think you of that *Cladophora gracilis*, or of that still more beautiful *Bryopsis plumosa*? We have heard some say that *Bryopsis plumosa* was the only figure they did not think quite true to nature. Had we never seen Irish specimens we would have said so too; but it is exceedingly like some we have from Lough Swilly. We must say, however, that our Scotch specimens from the west coast are more beautiful, and more conformable to the description given by the author. They are broader in the frond, richer and darker in the green, with more of the glossy varnished appearance. We must send him a specimen for the pleasure of *out-emeraldising* Ireland.

After what we have said, it would be tautology to add that we strongly recommend the work. From the mode of publishing in monthly parts, we have not yet got his introduction, &c., promised, which we are sure will be precious. In those circumstances, we may be excused for quoting, in conclusion, some sentences from the Introduction to his "Manual of British Algæ," published a few years ago:—

"The sportsman, it is true, often pursues his game with intense ardour till it is brought down, and then ceases to regard it with interest. So, I fear, it too often is with naturalists; but it is not necessarily so. Nay, of all men, they who are best acquainted with the works of the Divine finger, and who know how justly it may be said, 'we are fearfully and wonderfully made,' are surely most bound to cling to the truths of revelation, for they have continually before them collateral evidences of the certainty of those 'invisible things,' which are 'clearly seen, being understood by the things that are made, even His eternal power and godhead, so that they are without excuse.' If they too often neglect the true *use* of this knowledge, and rest satisfied with the knowledge itself, the fault and the loss is their own, and must not be charged to science. It is enough for her if she but furnish food which is capable of nourishing the well-directed heart; it is not her province either to cleanse that heart, or to give it powers of digestion. For this she must refer her votary to a higher and a holier voice; and if she ever speak of looking

'Through Nature up to Nature's God,'

she does so with a humble deference to her elder sister, whose province it is to lead the heart to that contemplation. Science and religion must not be confounded; each has her several paths, distinct, but not hostile; each in her way is friendly to man; and where both unite, they will ever be found to be his best protectors; the one 'a light to his eyes,' opening to him the mysteries of the material universe; the other, 'a lamp to his feet,' leading him to the immaterial, and incorruptible, and eternal. The 'eye,' it is true, will grow dim when the light of this world fails; and happy is he who then has 'a lamp' lighted from heaven, and trimmed on earth, to guide him through the hours of darkness. But the eye must not be blamed because it is not the lamp; nor should science be disdained because she leaves us far short of just conceptions of the invisible world. Her highest flight is but to the threshold of religion; for what a celebrated writer has said of philosophy generally, is equally applicable to every branch of scientific inquiry—'In wonder all philosophy began; in wonder it all ends; and admiration fills up the interspace. But the first wonder is the offspring of ignorance; the last is the parent of adoration. The first is the birth-throe of our knowledge; the last is its euthanasy and apotheosis.'"

Phycologia britannica, etc. Phycologie britannique ou Histoire des Algues marines de la Grande-Bretagne, contenant les figures coloriées, les caractères génériques et spécifiques, les synonymes et les descriptions de toutes les espèces d'Algues qui habitent les côtes des îles Britanniques ; par M. William-Henry Harvey, conservateur de l'herbier de l'université de Dublin. — Londres, chez Reeve frères ; Paris, chez Masson et Comp., place de l'École-de-Médecine.

Nous ne pouvons qu'annoncer ce grand ouvrage dont il n'a paru encore que la première livraison. D'après l'avis qui se trouve en tête de cette livraison, M. Harvey donnera des figures coloriées de toutes les Algues marines de la Grande-Bretagne ; il ajoutera au dernier des trois volumes que doit comprendre son livre, une introduction générale à la Botanique marine, et un synopsis systématique de la Flore marine britannique. Il prend pour point de départ l'ouvrage de M. Hassall, c'est-à-dire qu'il laisse de côté toutes les Algues d'eau douce, ainsi que les Desmidiées et les Diatomacées ; celles-ci sont, au reste, depuis quelques années, l'objet des travaux assidus de M. Ralfs qui a déjà publié sur elles plusieurs mémoires dans les *Annals and Magazine of natural history*, et qui prépare à ce sujet un grand ouvrage destiné à compléter le tableau de la Phycologie britannique.

Voici le plan de publication adopté par M. Harvey. Chacune de ses livraisons se compose de 6 planches avec leur description ; les espèces figurées sont absolument sans ordre et devront être classées plus tard, lorsque l'ouvrage sera complet. Malheureusement l'auteur numérote ses planches d'après leur ordre de publication, ce qui en rendra plus tard la citation assez difficile lorsque cet ordre, purement provisoire, aura été renversé, et ce qui amènera cette particularité bizarre que les espèces d'un même genre porteront les numéros les plus divers. Dans chaque livraison, M. Harvey réunit des espèces toutes de genres différents, de manière à pouvoir figurer ainsi dans son premier volume des représentants de tous les genres de la Grande-Bretagne, ce qui, dit-il, avec les descriptions des espèces et avec la classification présentée par lui dans son *Manual of British algæ*, permettra d'étudier avec profit la Phycologie pendant même que la publication se continuera.

Il se publie à la fois deux éditions de la *Phycologia britannica* : l'une, in-4°, du prix de 5 shillings (6 fr. 50 c.) la livraison ; l'autre, in-8°, du prix de 2 shil. 6 den. (3 fr. 60 c.).

Phycologia Britannica: or a History of British Sea-weeds, containing Coloured Figures, Generic and Specific Characters, Synonymes, and Descriptions of all the species of Algæ inhabiting the Shores of the British Islands. By WILLIAM HENRY HARVEY, M.D., M.R.I.A., Keeper of the Herbarium of the University of Dublin.

As great admirers of that beautiful portion of our flora, the subjects of which, even more than those of the land, are " born to blush unseen," we hail with extreme pleasure an illustrated 'History of British Sea-weeds.' And above all—on account of the accuracy it insures—one, in which every species inhabiting the shores of the British Islands will be drawn, lithographed and described by the same hand. The importance of this combination in the one individual is well known to all naturalists who have had any experience; the species being generally described by one party, drawn by a second, and engraved by a third:—and truly may we say, that " small by degrees and *beautifully* less" in accuracy is sure to be their fate the more hands they pass through.

This work is published in royal octavo, to admit of as many species as possible being figured of full natural size; when this cannot be done, a double plate will occasionally appear; and of the giants of the deep, a portion will be given of natural size; when the species are minute, two will be represented on the same plate, as we already see done in the *Elachisteæ*, seven species being thus figured in the one number instead of six, as announced in the prospectus. In every instance microscopical representations of the structure, fructification, &c. will appear, and all will be coloured.

The descriptive portion will be much more full than in any previous work in which our native plants have been treated of, for the 'Phycologia Britannica' will as a whole occupy a place by itself. We have ample descriptions of the species; their geographical distribution; their distribution on our own coasts; and their general history. To use the author's words:—" The plan which I have adopted is, to select the species illustrated in each number from several different genera, taken from as many families, so that there shall always be a variety of subjects in the monthly number; and, as early in the work as possible, *to figure one species at least of every genus*, so that by the end of the twentieth number, which will complete the first volume, illustrations of all the genera may be placed before the student. This, with the aid of the descriptions of species and sketch of a general arrangement afforded by the '*Manual*'* (which may serve as a synopsis of the principal contents of the 'Phycologia'), will afford him very great facilities for determining his plants during the progress of this work, even though the particular species which he has under examination may not be among those then figured in it. Were the plants to be published systematically, it is obvious that not till the completion of the entire work would the student have as much assistance toward understanding the genera, as he will now have at the end of the first volume. This arrangement is therefore decidedly the best for those who have purchased the 'Manual,' and as it appears to me, for those also, who, now commencing the study of *Algology*, wish to obtain speedily a general view of the principal varieties of marine plants."

Sixty numbers will complete the work, five of which are now before us, and we question whether a more beautiful botanical work, plates and typography combined, has ever issued from the press,—at so low a price we feel certain that none has. In these five numbers appear species altogether new (*Griffithsia devoniensis, Elachistea attenuata*); some before known in other seas, but now for the first time added to our flora (*Chordaria divaricata*); and several species figured for the first time.

So favourably is Mr. Harvey known to the botanical world as an algologist, that to speak of his excellent treatment of the subject in all its bearings, as known to the present time, seems to us superfluous. We say advisedly as known to the present time, for sufficient attention has not hitherto been paid to the general œconomy of the Algæ. A knowledge of the peculiar rocks, soils, &c. affected by the various species; the ranges of depth, influence of currents and tides, not only on their presence, but on their growth, rendering them dwarfed or luxuriant according to circumstances, have not, at least in our own country, been properly studied. These causes have a much more important bearing on Algæ than a mere difference of latitude. We trust therefore that the author will throughout his work afford us all the information he can obtain on these interesting points—in natural history every positive observation is of value. We have ourselves attended to some extent to what is here suggested, and have been much interested to find upon coasts of similar mineralogical and geological character, though separated by several degrees of latitude, the same broad botanical features; indeed, the mere appearance of a particular character of coast at any part of the British Islands suggests to us its productions. Yet are there some species so far influenced by latitude, as not to be found further south than our more northern shores, and others again not further north than our more southern coasts: in such cases our shores are the extreme limits of the species in the respective directions. Further we need not here enter into this subject, but instead, call upon our author to give us all the information in his power.

The 'History of British Sea-weeds' we can most faithfully recommend for its scientific, its pictorial, and its popular value. The professed botanist will find it a work of the highest character. Persons who have not commenced the study, or who desire merely to know the names and history of the lovely plants which they gather on the margin of the sea, will find in it when complete the faithful portraiture of every one of them. Those who have not that happy privilege, but in " close cities pent," or confined to the inland country, will have before them pictorial representations only less fresh and glowing than the beautiful originals; and those who merely desire what the French call a work of luxury for the drawing-room table, will, owing to the extreme variety and delicacy of form of the objects, combined with the most glowing colours, find that no work at the same cost is more attractive, or should be preferred before it.

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* Manual of British Algæ, by the same author, published a few years ago.

Phycologia Britannica; or, a History of British Sea Weeds. Part I. By William Henry Hervey, M.D.—This work which has long been anxiously looked for by British botanists—especially those devoted to the study of Cryptogamic Plants—will not be the less welcome because it has come so late. There are few persons in Great Britain who so largely combine the necessary knowledge with that power of observation and cautious induction which enables justice to be done to the subject as Dr. Hervey. The Part before us contains plates and descriptions of six species: and the author proposes to publish in each Part species from several different genera taken from as many families—so as to secure a variety of subjects—and make good as soon as possible the publication of one species at least of every genus. In this way, by the time when the twentieth Part shall be published every genus of Marine Algæ will be illustrated. The drawings accompanying the present Part are beautifully executed; and the microscopic dissections are more elaborate than any previously devoted to this tribe of plants in this country. The work will be confined to the sea-weeds: although we hope the author will meet with that encouragement which will induce him to take up the British Freshwater Algæ—a subject with which he is not less familiar than with the present, and which has hitherto been but imperfectly treated.

Phycologia britannica: or a History of british Sea-Weeds, containing coloured figures, generic and specific characters, synonymes and descriptions of all the species of Algae inhabiting the shores of the british islands. By William Henry Harvey. London. 1846. gr. 8.

Von diesem bedeutenden Werke, welches in der Einrichtung der Cryptogamic Scotish Flora von Greville und der English Botany gleicht, liegen uns gegenwärtig 10 Hefte, jedes mit 6 Tafeln Abbildungen, vor. Wie das Werk von Hassall die Süsswasseralgen, so soll dieses die brittischen Seealgen behandeln. In der Reihenfolge der Tafeln wird keine systematische Ordnung befolgt, sondern die Gegenstände werden von dem Verf. geliefert, wie sie gerade frisch zur Hand liegen. Das Werk ist dem Director der Königl. Gärten zu Kew, Will. J. Hooker, gewidmet. In der Vorrede spricht sich der Verf. über den Plan des Werkes aus und bemerkt, dass er die *Desmidieae* und *Diatomeae* ausschliessen werde, theils weil dieselben so zweifelhaft zwischen dem Pflanzen- und Thierreich stehen, theils aber auch, weil Ralfs dieselben noch in einem besondern Werke zu bearbeiten gedenke. Man sieht hieraus, dass die Britten in jeder Beziehung ein praktisches Volk sind; sie vertheilen die Arbeiten ohne Neid unter sich, unterstützen sich gegenseitig, während bei uns Deutschen nicht selten gutgemeinte und ehrliche Anerbietungen vornehm zurückgewiesen und dadurch Veranlassung werden, dass jeder sich auf seinen eignen Füssen eine feste Stellung zu sichern sucht.

Der Inhalt ist folgender: Plate I. *Dictyota Atomaria.* Fig. I. Abbildung in natürlicher Grösse sehr schön; Fig. 2. 3. u. 4. mikroskopische Analyse mangelhaft, es fehlt der Querdurchschnitt. Pl. II. *Delesseria Hypoglossum*, verdient dasselbe Urtheil. Meine Darstellung der Fruchtorgane der Delesserieen und die darauf neu und sicher gegründeten Gattungen finden leider immer noch keine Würdigung; man hat sich nun einmal zu sehr an das Auswendige, Oberflächliche, was nicht viel Mühe macht, gewöhnt. Pl. III. *Bryopsis plumosa.* Pl. IV. *Ectocarpus brachiatus*; ich sehe bei dieser Abbildung, dass ich,' gestützt auf französische Exemplare dieses Namens, unter diesem Namen eine andere Art (unter *Corticularia*) beschrieben habe. Pl. V. *Callithamnion gracillimum*; im Ganzen gut. Pl. VI. *Cladophora lanosa*; die Farbe ist viel zu dunkel gegen meine, die ächte Roth'sche Pflanze. Pl. VII. *Polysiphonia furcellata*; eine sehr hübsche Figur, nebst hinreichender Analyse, doch ohne Kapselfrüchte. Pl. VIII. *Punctaria latifolia*; Fig. 1. natürliche Grösse sehr schön, die mikroskopische Analyse (Fig. 3. 4.) mangelhaft. Pl. IX. *Nitophyllum versicolor*; eine hübsche Darstellung der Art in natürlicher Grösse, von der jedoch die Früchte noch nicht bekannt sind; sie scheint aber hinreichend von ihren Verwandten (*N. Bonnemaisonii* u. *Gmelini*) verschieden. Ich hätte übrigens gewünscht, dass Verf. den hybriden Gattungsnamen mit dem von Montagne verbesserten — *Aglaophyllum* — vertauscht haben möchte. Pl. X. *Polysiphonia Richardsoni*; gute Abbildung. Pl. XI. *Asperococcus Turneri*; die Analyse mangelhaft (Fig. 3. gibt sogar ein ganz falsches Bild), sonst gut. Pl. XII. *Cladophora rectangularis*; recht gut. Pl. XIII. *Kalymenia reniformis*; eine hübsche Tafel, bei der auch die Analyse (Fig. 6.) besser gelungen ist. Sie nähert sich dem Bau nach meiner Gattung *Sarcophyllis.* Pl. XIV. *Carpomitra Cabrerae*; im Ganzen gelungene Figur, auch die Analyse befriedigend. Pl. XV. *Gracilaria polycarpa*; die Analyse der Frucht ganz verfehlt, das Uebrige gut. Pl. XVI. *Griffithsia devoniensis* (n. sp.); gut. Pl. XVII. *Chordaria divaricata*; Fig. 1. natürl. Grösse, sehr gut, die Analyse befriedigend. Pl. XVIII. *Cladophora gracilis*; gut, nur die Farbe zu dunkel. Pl. XIX. *Haliseris polypodioides.* Pl. XX. *Phyllophora Brodiaei.* Pl. XXI. *Seirospora Griffithsiana*; gut! Pl. XXII. *Ectocarpus Hinksiae.* Pl. XXIII. *Nitophyllum Bonnemaisoni.* Fig. 1. gut, Analyse mangelhaft. Pl. XXIV. *Cladophora fracta*; wie Pl. XVIII. Pl. XXV. *Striaria attenuata*; wie Pl. XXIII. Pl. XXVI. *Delesseria ruscifolia*; ebenso. Pl. XXVII. *Wrangelia multifida*; ebenso. Pl. XXVIII. A. *Elachistea attenuata*; gut, ist aber mit meiner *Myriactis pulvinata* aus dem Golf von Neapel identisch. B. *Elachistea velutina*; befriedigend. Pl. XXIX. *Microcladia glandulosa*; ist eigentlich ein *Ceramium*, die Gattung muss daher eingezogen werden, es sei denn, dass man in der einseitigen Stellung der Vierlingsfrüchte an den Spitzen der Aeste ein hinreichendes Gattungsmerkmal besässe, dann würde man aber wohl auch einige bis jetzt bei *Ceramium* beschriebene Arten dazu bringen müssen. Die Abbildung recht gut. Pl. XXX. *Cladophora Braunii*; gut. Pl. XXXI. *Mesogloea vermicularis*; ein ungewöhnlich dickes Exemplar, mit befriedigender Analyse, nur sind die Conturen sehr grob. Pl. XXXII. *Rhodymenia bifida*; muss wegen der Bildung der Vierlingsfrüchte von *Rhodymenia* getrennt werden; ich habe daraus die Gattung *Rhodophyllis* gebildet. Pl. XXXIII. *Cladostephus verticillatus*; gut. Pl. XXXIV. *Odonthalia dentata.* Pl. XXXV. *Codium adhaerens* und *C. amphibium*, letzteres erst 1844 von Moore und Harvey in den Ann. and Mag. of bot. hist. beschrieben; beide sind gut dargestellt. Pl. XXXVI. *Nemalion multifidum*; gut! Pl. XXXVII. *Sphacelaria scoparia*; die Analyse unzureichend; beim Querschnitt ist die kleinzellige Corticalschicht nicht dargestellt, statt derselben dient ein dicker dunkler Ring; ferner sind die Darstellungen von Fig. 2 u. 4. so, dass man meint, die Glieder wären einzellig, während sie doch der Länge nach in mehrere prismatische Zellen getheilt sind, was Alles nicht dargestellt ist; nach solcher mangelhaften Analyse ist es mir dann freilich erklärlich, warum die neue Gattung *Stypocaulon* (nicht *Stypopodium*, wie Verf. citirt), die ich aus dieser Art bildete, keine Anerkennung gefunden. Pl. XXXVIII. *Naccaria Wigghii*; im ganzen gut; bei Fig. 7., welche einen Längenschnitt darstellt, fehlt aber die Mittelaxe. Pl. XXXIX. *Ulva Linza*; hier ist kein Querschnitt beigefügt. Pl XL. *Dasya ocellata.* Pl. XLI. *Myrionema Leclancherii* und *M. punctiforme.* Pl. XLII. *Chylocladia reflexa*; die Analyse fehlt. Pl. XLIII. *Enteromorpha erecta*; mangelhaft. Pl. XLIV. *Plocamium coccineum.* Pl. XLV. *Laminaria Fascia.* Pl. XLVI. *Spyridia filamentosa.* Pl. XLVII. *Fucus serratus.* Pl. XLVIII. *Helicothamnion scorpioides.* Pl. XLIX. *Desmarestia aculeata.* Pl. L. *Rhodomela lycopodioides*; es fehlt hier die Darstellung der Mittelaxe beim Quer- und Längenschnitt. Pl. LI *Bonnemaisonia asparagoides.* Pl. LII. *Fucus Mackaii*; Fig. 1. eine sehr hübsche Figur mit Früchten, wie ich sie noch nicht gesehen. Pl. LIII. *Gelidium corneum*, in mehreren recht gut dargestellten Formen in natürl. Grösse. Pl. LIV. *Conferva tortuosa*, *implexa* u. *arenosa*; die Synonymie der beiden ersten ist zum Theil noch recht verwickelt. Pl. LV. *Laurencia pinnatifida*; ein grosses schönes Exemplar. Pl. LVI. *Sporochnus pedunculatus.* Pl. LVII. *Gloiosiphonia capillaris.* Pl. LVIII. *Calothrix fasciculata* und *scopulorum*; die Abbildungen von beiden sind ungenügend. Pl. LIX. *Dumondia filiformis.* Pl. LX. *Cystoseira granulata*; gut!

Im Allgemeinen finde ich die Abbildungen der Algen in natürlicher Grösse sehr gelungen, oft sogar sehr schön und treu, besonders in Bezug auf die Farbe, und darum haben diese Tafeln bei der Bestimmung der Arten ihren grossen Nutzen; nur die Analysen sind meist unbrauchbar, wodurch freilich ihr wissenschaftlicher Werth sehr beeinträchtigt wird. Wir wünschen dem Verf. Musse und Kraft, dass er in den folgenden Heften die wahre Wissenschaft ebenso berücksichtige, als die Liebhaber, deren es freilich in England eine grössere Anzahl gibt, als in irgend einem andern Lande.

PHYCOLOGIA BRITANNICA;

Or, HISTORY of BRITISH SEA-WEEDS, containing coloured Figures, Generic and Specific Characters, Synonymes, and Descriptions of all the Species of Algæ inhabiting the Shores of the British Islands. By WILLIAM HENRY HARVEY, M.D. M.R.I.A., Keeper of the Herbarium of the University of Dublin.

"The drawings are beautifully executed by the author himself on stone, the dissections carefully prepared, and the whole account of the species drawn up in such a way as cannot fail to be instructive even to those who are well acquainted with the subject. The price, too, *half-a-crown* for each fasciculus of six plates, is extremely reasonable. More than a third of the species in the three Numbers which have appeared have not before been figured."

Gardeners' Chronicle.

"Before the appearance of any portion of this work, there could be but one opinion, from what he has already done, of Dr. Harvey's thorough fitness for the letter-press department. Happy are we to find that his pencil is not less felicitous than his pen. The drawings—admirably true to nature—are executed in a most masterly and tasteful style; and well is it that this work has fallen into the hands of Messrs. Reeve, who have done great justice to the letter-press part of the work, and whose coloured plates are truly exquisite. The figures of the natural size are exceedingly like; and the magnified portions of the fructification of the frond, and of the stem, will be of the greatest possible service."—*Edinburgh Witness.*

"Besides the beautiful figures of the plant in its entire state, the microscopical dissections which are introduced into each plate are beyond all praise, and will, we doubt not, tend vastly to advance the progress of physiological botany. The comparatively recent employment of achromatic object glasses, with other important improvements in the microscope, have placed in the hands of the naturalist an instrument which has revealed to him secrets of which our predecessors had no idea; and perhaps our readers are not all aware that among the lower forms of vegetable organization a series of phenomena, as unexpected as they are mysterious, have within the last few years been detected. One of the great advantages of the work which constitutes the subject of the present notice, is, that with all its high scientific character, it is admirably adapted to popularize the department of knowledge of which it treats. With its beautiful figures and lucid descriptions it brings home to our very drawing-rooms the crimson sea-weed fresh and unfaded, almost as if just gathered from its ocean bed; the mere turning over of the pages presents to the reader's eyes forms of beauty of which he before never dreamt, and no matter how little accustomed he may be to have his thoughts directed to such subjects, he cannot help rising from the perusal of the work no longer ignorant of some of the fairest forms of creation."

Saunders' News Letter

London: Reeve, Brothers, King William-street, Strand

Appendix IV

Miscellaneous information on *Phycologia Britannica*

1. Factors potentially affecting accurate recording of publication dates of parts of the work

Sequences of part dates during the currency of the production of the primary version of *Phycologia Britannica* are already presented in Price (1984). In case apparently contradictory evidence disagreeing with or refuting conclusions reached there should emerge, it is worth recording here those characteristics of the general situation which may have affected the quality and nature of any such evidence. These characteristics are recorded here as specific cases known to have occurred; there may be others hitherto unrecorded.

A. Announcement inside the front wrapper of Part 3 as issued:

The text of this announcement was as follows:

> HARVEY'S BRITISH SEA-WEEDS.
>
> *To Correspondents.*
>
> Messrs. Reeve have much pleasure in stating that the *PHYCOLOGIA BRITANNICA* has been hitherto, and they trust always will be, ready for trade-delivery *two days prior to publication*.
>
> They also take this opportunity of announcing that Part 1, of which copies were exhausted by the 15th. ultimo, is re-printing, and will be ready for delivery on the 15th of the present month.
>
> King William Street Strand.
> March 1st, 1846.

This is a literal restatement of the text of the announcement, with all typefaces and punctuation precisely as originally given.

As will be evident, the information so presented highlights certain possible results:

(i). That trade delivery two days earlier than publication date (day) may have occasionally resulted in slightly premature release to the public or to subscribing institutions, with consequent recording of so-called publication date in the ultimate few days of the month before rather than on the first (or in the first few days) of the correct month. It is, of course, quite legitimate to argue that if trade delivery to the Act institutions was practised, the recording by them of publication date to that pattern, particularly if accompanied by erroneous release to public or subscribing institutions, *constitutes actual publication* on whatever was the trade release date.

(ii). Part 1 was sold out by 6 weeks (i.e., 15 February) after its publication date on (supposedly) 1 January 1846. It was reprinting so as to be re-released on 15 March 1846. The potential dating confusion inherent to *that* situation requires no explanation and very little emphasis!

Announcements such as these were not strictly limited to publication in the actual parts of the work itself; see B below.

B. Announcements in The Athenaeum, **1846** (957): 232, *dated 28 February 1846*

This announcement by Lovell Reeve concerning publications listed, *inter alia*, as being published that day, Part 3 of *Phycologia Britannica* (*cf.* trade release comments above) and interestingly continued:

> Part 1, reprinting, will be ready for delivery on the 15th March

At least the re-release date is consistent between the announcements in the work and elsewhere!

The presence in print of these two announcements A and B suggests that Reeve, in the early stages of the work's currency, had been over-cautious in his print runs, underestimating the demand for the work. Initially, I believed that the failure to trace other similar advertisements relating to other re-printing of different parts perhaps indicated that whatever adjustments this had led Reeve to make to his print-runs had resulted thereafter in *over-estimates* of demand, and this appeared borne out to some extent by the existence of remainders of virtually all plate-texts, acquired some years ago by Dr W. F. Farnham, who kindly passed a set on to me. Any such reprinting could also go some way toward explaining the different qualities of colour and shade that may be encountered amongst the different sets of the so-called 3-volume 'first issue' (numerical order of plate issue), if plate reprinting had also been usual (see Appendix IV (4), for more discussion).

It does not, however, seem likely that the suggested over-estimating was consistent, unless the demand was remarkably irregular for different parts as issued, a situation which seems highly unlikely. Subscribers who started off with the work would be likely to continue with consistency, if at all, and new later subscribers would be likely to require whole back numbers, not a mosaic pattern amongst them consequent on likes or dislikes, artistic or scientific. The reason for stating thus as to the inconsistency of over-estimating by larger print-runs lies in the existence of a note, now in my possession, which was present in my copy of part 28 in its wrappers. This was clearly written to whomsoever was the original purchaser of that part 28, from someone at the publishers (Lovell Reeve) or at the supplying Agents; it reads:

> 4 Parts (Nos. 12. 14. 15 & 16) are at this time out of print, but will be republished
> in about 3 Weeks—27 April 1848—
> 23 parts herewith
> 1 previously
> —
> 24
> —

Hence it seems that the absence of advertisements on reprinting of parts during the later currency of the overall work does *not* establish that it was not occurring, but the tone of the above note would suggest that the pattern of reprinting was purely a reaction to demand, not forward plan or policy. Numbers reprinted of parts at any one time could therefore very well have been quite small.

It is probable that there is parallel between the requirement to reprint certain parts for whatever reasons and the established existence of typeface and arrangement/content variation versions of the text in known cases (see Table I). There is no guarantee that this parallel is precise. It is more probable that typeface variation would occur when the time interval between original printing and required subsequent printings was longer, less probable when the interval was shorter and the type therefore likely to be retained as set. The need to revise data or arrangement in any species entry would, of course, probably destroy even that potentially direct relationship. The chance non-availability of the usual typesetting organisation employed could also have caused variation patterns when there was pressure to reprint quickly.

2. Factors potentially affecting other variations between sets of the work

A. Fundamental textual changes

In general, the textual variations detailed earlier in this study involved *no* fundamental changes in content. Changes in taxonomic and/or nomenclatural opinion caused Harvey to alter radically and publicly the arrangement, content and names used in *Phycologia Britannica* for only two species after the initial publication. These were those of plate 15 (originally called *Gracilaria polycarpa* J. Agardh), which became *Gracilaria multipartita* J. Agardh, and plate 48 (firstly *Bostrychia scorpioides* (C. Agardh) Montagne), which was altered to *Helicothamnion scorpioides* (C. Agardh) Kützing.

These changes originated differently, in the case of plate 15 from additional information provided by a colleague and for plate 48 from a change of mind by Harvey himself. René Lenormand, a French contemporary and friend of Harvey, pointed out to him that, in connection with plate 15, the *Rhodomenia polycarpa* of Greville (the origin of the epithet first used here) was applied to a plant identical to that forming the basis of the older *Fucus multipartitus* of Clemente. The original letterpress for plate 48 stated that 'The name *Helicothamnion*, proposed by Kützing for *B. scorpioides*, must be laid aside, as that of *Bostrychia* has the priority, is equally applicable, and more euphonious.' Some event (it is not yet clear what) led to a change of mind, since the revised (*Helicothamnion scorpioides*) letterpress indicated: 'it forms a connecting link between several genera. The nearest group to which it approaches is to *Bostrychia* of Montagne, and I regret that I cannot coincide with my learned friend in associating it with the other individuals of that genus. In *Bostrychia* proper, the frond has a wide, articulated central tube, surrounded by a single row of coloured cells; here the frond is solid, consisting of several concentric rows. According to modern views of arrangement, such differences of structure are regarded as of generic importance.'

Since these texts were revised by Harvey after issue of the original parts (3 and 8) to subscribers, Lovell Reeve was obliged to send out revised texts with a Notice, which stated:

> Subscribers to the 'PHYCOLOGIA BRITANNICA' are requested to cancel the letter-press issued with Plates XV. and XLVIII. at the time of publication, and to substitute the enclosed.

As a result of this, which clearly occurred nearer in time to the original issue of plate 48 than that of plate 15, various different combinations of original text and revised text tend to be found, the most usual seeming to be the original version of 15 with the revised version of 48. It is not easy to see why this should be, since both would occur in volume 1 as completed, even of the original numerical version; a combination of both revised plate-texts changed or neither changed would have seemed much the more likely. Neither of these two texts reverted finally in this work to the original naming; each is known to exist in textual versions of state 1 (original); state 2, version A (first printing of changed form and name); state 2, version B (second printing, with the usual Greek script typeface changes). Several potential combinations may thus theoretically be met with in bound sets.

B. *Significant changes in plates*

Variations detailed in A above did not, fortunately, lead directly to any need to alter plates. Most of the detected variation between copies of the same plate in this work arise from the market demand, reprinting or otherwise, and are insignificant on any basis other than confusion due to sloppy coloration and consequent poor detail. For data on such pattern of change, see Appendix IV (4), below.

In at least two cases, however, matters could have been more significant, and it is possible that the event to be noted here *was* more widespread; the available evidence does not preclude that. Filed in W. J. Hooker's English Letters for **1847** is a letter (f. 215) written by Harvey to Hooker on 25 May [1847]. This letter, talking in general terms about various aspects of the *Phycologia Britannica*, includes:

> Are you aware that *two* of the plates in the $1^{\underline{st}}$ Number had lately to be *re-drawn* by some one that Reeve employed, and are *not* well copied. Pl. 2 & 5 are the subjects. The early subscribers have therefore better copies than can now be had of the $1^{\underline{st}}$ Number. I hope none other may perish in a similar manner.

This is so largely self-explanatory as to require little or no further direct comment, save for on one very curious facet. Plates 2 (*Delesseria hypoglossum*) and 5 (*Callithamnion gracillimum*) are precisely those that Harvey drew very early on (see earlier and Plates 4 and 5) under

Fitch's tuition whilst at Kew in 1845, as his 'Lesson N°. 1' (pl. 2; see Plate 4) and 'Lesson N°. 2' (pl. 5; see Plate 5). They were deemed sufficiently well done to be utilised directly as the originals of the two published plates. It is not clear what significance can be read into this, but some very interesting speculation immediately arises!

C. The different overall arrangements of the completed work

A slip entitled 'Directions to the Binder' was issued at a point at the end of the work that is presumed to be simultaneous with the circulation of part 60 and the Synopsis. This slip gives very precise instructions on the various versions of arrangement and final binding, which seem in general to have been adhered to, particularly in the more popular and practical systematic arrangement (4 volumes). The 3-volume version, which had the advantage, retaining the numerical order of original issue, of being bindable as volumes were completed, is despite that only very occasionally encountered in a work which (in any version) appears less and less often on the market. Since there are undoubtedly very few copies remaining extant of the original instructions slip, the complete text of that is repeated here. Little need be added, for its message is precise and self-explanatory, even making it clear why so few copies of the precursor *List of British Marine Algae* are ever encountered. The slip that bears these instructions is a mere 6″ (15 cms) long by 3″ (7.5 cms) high.

> *DIRECTIONS TO THE BINDER*
>
> The Plates and Letter-press of this work may be bound either in the order of publication, or arranged systematically.
>
> If bound in the order of publication the 'Phycologia' forms three volumes, each of 120 plates; and for this purpose three title-pages, dated respectively 1846, 1849, and 1851, and three indices, are given. The Synopsis and its index, furnished with Part LX., may be prefixed either to the first or the third volume. The "*List of the British Marine Algae arranged systematically*," published with Part XX., is to be destroyed.
>
> If bound *systematically*, the plates are to be arranged in the order of the *Synopsis of the Species*, given with Part LX., and will form four volumes, for which title-pages (dated 1846–1851) are supplied.—In this case the three old Titles and the "*List*" above named are to be destroyed, and the "Synopsis of Genera and Species," with Index, as well as the three indices of species and synonyms, are to be prefixed to the first volume. In a few cases where two or more species are figured on the same plate, the plate is to be placed in the order of the number of the first species.—Plates 357 and 358, with their letter-press, being supplementary, are to be inserted at the end of the Rhodospermeae in vol. 2.

For further general comments on copy variation patterns, see p. 214.

3. Standard retail selling prices and the advertisement of parts and volumes: data pertinent

In the early periods of the issue of this work, as well as subsequently around the times when volumes or volume sets were completed and offered for sale in that complete form, advertisements tended to emphasise, or at least cite clearly, the prices at which the *Phycologia Britannica* was retailing. The data which follow are largely derived from those sources, although amplified, confirmed or altered according to supplementary data in correspondence and other manuscript sources.

(i) Parts

Royal 8^{vo} (smaller paper) version retailed at 2/6d per part.
Royal 4^{to} (larger paper) version retailed at 5/– per part.

Rather few copies in Royal 4to were produced; these were as printed text and plates no larger, but merely printed on the 'best' paper at Royal Quarto size, thus having wider margins. In the early currency of the work, both versions were advertised (as, for example, with *The Athenaeum* advertisement for part 1, of 27 December 1845). Quite soon, however, the smaller paper version became the only one mentioned in some advertisements. This was probably due to a combination of restricted interest in the inflatedly priced Royal 4^{to} version (although there are cases cited in correspondence where purchasers would have taken that version had they known of its existence) and of fairly low numbers of that version being available for retail—Harvey specified that presentation copies to certain important individuals should be of the 'best version'. Nevertheless, *The Athenaeum* carried fairly consistently notices that referred to both Royal 4to and Royal 8vo; examples are the issues of **1845** (948): 1234, 27/12/1845; **1846** (957): 232, 28/2/1846; **1846** (992): 1128, 31/10/1846; **1847** (1006): 138, 6/2/1847; **1847** (1009): 229, 27/2/1847; **1847** (1010): 267, 6/3/1847; **1848** (1060): 178, 19/2/1848; **1848** (1065): 325, 25/3/1848; **1848** (1070): 446, 29/4/1848; **1848** (1074): 523, 27/5/1848; **1848** (1076): 570, 10/6/1848; **1848** (1079): 643, 1/7/1848; **1848** (1083): 738, 29/7/1848; **1848** (1085): 788. 12/8/1848; **1848** (1086): 820, 19/8/1848; **1848** (1087): 894, 2/9/1848; **1848** (1092): 989, 30/9/1848; **1848** (1096): 1087, 28/10/1848; **1848** (1101): 1194, 2/12/1848; **1849** (1114): 214, 3/3/1849; **1849** (1123): 451, 5/5/1849; **1850** (1161): 109, 26/1/1850; **1850** (1167): 254, 9/3/1850; **1850** (1169): 322, 23/3/1850; **1850** (1192): 933, 31/8/1850; **1850** (1196): 1028, 28/9/1850.

This is not an inconsiderable amount of advertising, even in a single journal of 'literary intelligence' and general cultural background (of which a number still then existed), and tends to contrast rather starkly with Lovell Reeve's *dictum* (see earlier) that he spent comparatively little on advertising his publications. When, to this, are added the advertisements in the same journal and citing only the cheaper Royal 8vo version at 2/6d (list below), the feeling is strong that members of the relevant public could hardly have been unaware of the work.

Royal 8vo solely was referred to in *The Athenaeum* of **1845** (940): 1062, 1/11/1845; **1846** (952): 81, 24/1/1846; **1846** (953): 134, 31/1/1846; **1846** (961): 334, 28/3/1846; **1847** (1017): 428, 24/4/1847; **1847** (1051): 1307, 18/12/1847.

Taking the pattern for this particular journal as indicative, it seems likely that the preponderance of earlier advertisements referred principally or only to the version Reeve thought most likely to sell to the general public interested but outside directly phycological/botanical circles of initiation. Royal 4to, the expensive large paper version, required initially less advertising since likely to be used for either presentation/the author's own purchases, or sale to moneyed amateur scientists or bibliophiles whose tastes and pockets ran to the better versions of works judged worthy of their shelving space. Fewer numbers by far were printed. Possibly even then they were not exhausted, which may explain the flood of early-1847/1848/1850 advertisements—a measure both to revive perhaps flagging general interest, despite maintained consistency of appearance, and to induce sales of sluggishly-moving and available large paper copies of parts. It is possible that the fewer notices of part appearance and sequence during 1847 and 1849 (in no way related to any inconsistency of publication then) are correlated with the greater natural publicity and interest stimulated in those years because of the completion of volumes 1 and 2 respectively, re-emphasising existence, completeness, maintenance of promised production, convenience of whole-volume purchase, and indeed everything which kept the work in the limelight.

(ii) Volumes

The three-volume (numerical order of issue) version was issued complete as individual volumes as they were completed by the monthly system. These were priced as:

Ordinary size (Royal 8vo)	50/– (£2.10s.) per volume.
Large paper size (Royal 4to)	£5 per volume.

Statements made regarding the 3-volume version in Royal 8vo usually include the full price of the whole set as £7.10s. It is easy to see that this should happen by extrapolation from those earlier advertisements put out when the completed volumes 1 and 2 were already available but volume 3 was still in progress. The assumption appears to have been made that even then the total overall price would be 3 × 50/–, i.e., the £7.10s. The latter seems to have been correctly the total when the 4-volume (systematic arrangement) Royal 8vo series was offered for sale with new title pages as a 'New Edition' (*cf.* Badham's *Esculent Funguses*, Ed. 2, 1863: publisher's announcements, p. 9, in the rear pages). However, at the first state (3-volume) stage in the publication, it appears that the 3rd volume was retailed at £2. 12s. 6d, thus accounting for the occasionally noted statement that the overall price was £7. 12s. 6d. Even here, there is some equivocation.

Bent's Monthly Advertiser, No. 568, pp. 148–150, of 11 August 1851, the year of completion of *Phycologia Britannica*, lists among other works published between 9 July and 9 August 1851 an entry (p. 149) for the *Phycologia Britannica* as 'V[ol]. 3, 4to, 2*l*.12s.6d.—complete, 3 v[ols]., 7*l*.12s.6d.' All well and good, but the reference here is to the '4to.' version which, if other advertised information (*cf.* above—repeated almost *ad nauseam*) is correct, *should* have been advertised at something around £15. It is probably that this is a mis-assessment of the publisher's ideas on size of the work; Royal 8vo., the publisher's description, is not vastly short in height and general appearance of works that would otherwise have been assessed as 4to and this appearance may have led the *Monthly Advertiser* to identify a quarto version as Royal 8vo and to state the price accordingly. If so, it still represents a mix-up but could be a confirmation of the overall price of the 3-volume Royal 8vo set as £7. 12s. 6d. Although there is no traced advertised statement of price to that effect, analogy suggests that the 4to complete 3-volume version may have been initially priced not at £15 as a straight 3× multiple of the single volume price, but at £15.5s, the last volume being individually £5.5s.

The 4-volume Royal 8vo systematic version, as offered for sale complete rather than resorted from the numerical order by earlier purchasers of the part publication during issue monthly, was stated by Batters (Manuscript Bibliography of British Phycology; BMNH) to have been priced originally at £7. 17s. 6d. The later 'New Edition' of the 4-volume version (see above), by contrast, was priced at £7. 10s. when advertised in 1863.

Actual advertisement of the volumes as they appeared has not been followed slavishly simply in order to trace the advertisement pattern; it seems in any case to have been very much of a mosaic. In *The Athenaeum*, volumes 1 and 2 together, or volume 2 as completed, were noticed quite frequently throughout later 1849 and 1850. Presumably the initial inspiration to purchase volume 2, on its completion in April 1849, had begun to tail off and these were attempts both to resuscitate that and to maintain part purchase towards volume 3.

It did not take very long in the background jockeying between author and his associates, and the publisher, before the matter of selling price came into some prominence. The amount spent by Reeve (or *not* spent, as the case may be) on colouring the plates and the effect that had in turn on the standard of certain plates was already being debated by 26 April 1846, especially in the context of the part for June of that year (part 6). In his usual role as 'Umpire' (the letter concerned so begins!), J. D. Hooker was appealed to by Harvey for support and amongst the complaints aired was one that Reeve was not spending enough to maintain standards necessary in the colouring of plates for that part; Harvey uttered the plaintive cry then

> 'We have priced the work too low—and I know not how the difficulty is to be met.'

4. Analysis of the merits and accuracy of colouring and form in the *Phycologia Britannica* plates

A fair degree of unevenness exists throughout the run of the work in all its different versions and volumes/sets. Thus, any generalisation here is going to present injustices and over-commendations at some stage or other. Bearing this in mind, it is still fair to say that the colour printing of the earlier produced versions of the primary edition is far superior to the rendering in any of the subsequent 'editions' and probably so to most of the reprinting that was carried out, where necessary, when supplies ran out of any of the parts. The supply of plates throughout was, so far as can be ascertained, very much of a mosaic, dependent upon what needed reprinting for further supply and what did not. Hence, most of the non-primary later issuing consisted of a patchwork quilt of the remainders of primary printing, mixed in parts or volumes with various stages of secondary printing. This made for additional heterogeneity that is difficult to track and even more difficult to assess. It has similarly not been unknown for book-dealers of all subsequent eras to cannibalise imperfect or incomplete copies from different 'editions' or 'printing', themselves probably already a mixture of the kind referred to above, and further mix those in order to complete more nearly full copies from different backgrounds. The endless intermeshing of that situation needs no further elaboration, and applies equally to plates and to text.

The primary printing is itself variable according to the algal group concerned (and therefore to the outline colour used, aside from the infill washes) and to the difficulty or otherwise of rendering a 'natural' appearance for that particular alga. Some of the Rhodophyta printing was quite spectacularly succcessful as, to a lesser extent, was some in the other groups. Many of the laminate or broad-fronded brown algal illustrations are far from good, however, a fact which in all justice one has to accept that Harvey himself realised; an example is that of *Haliseris polypodioides* (pl. 19),* the natural coloration of which is notoriously difficult to capture—there is in the plate no hint of the yellowish-brown translucence/opacity that is normally met with in field material, the whole plant here being excessively biased toward the green. Many others suffer this same green excess; examples are *Dictyota atomaria* (pl. 1); *Elachist[e]a attenuata* (27A); *Cladostephus verticillatus* (33; although *C. spongiosus*, 138, is rather better); *Sphacelaria scoparia* (37); *Myrionema leclancherii* (41); *Sporochnus pedunculatus* (56); *Arthrocladia villosa* (64); *Stilophora rhizodes* (70); *Asperococcus compressus* (72); *Himanthalia lorea* (78); *Alaria esculenta* (79); *Pycnophycus tuberculatus* (89); *Padina pavonia* (91); *Dictyota dichotoma* (103); *Sargassum bacciferum* (109); *Sphacelaria filicina* (142); *Ectocarpus pusillus* (153); *Fucus nodosus* (158); *Fucus vesiculosus* (204); *Cystoseira ericoides* (265); *Fucus ceranoides* (271); *Laminaria longicruris* (339). These brown algae of larger aspect are not by any means the only ones to suffer from an extreme colour bias.

Many of the green algae and associated groups throughout the run of the *Phycologia* demonstrate plates with erroneous extremes of coloration, even where the primary plate version is involved. A good example of this error is the plate of *Bryopsis plumosa* (3), which has too much of a sea-green tinge, being naturally usually much brighter and with a more pronounced clarity of pigmentation in the yellow-green part of the band. *Cladophora refracta* (24) shows much the same problem, despite being referred to in the description as a 'brilliant yellowish green'. A degree of the same inaccuracy is manifest by the plates of all the following: *Codium adhaerens* (35A); *Ulva linza* (39); *Enteromorpha erecta* (43); *Cladophora macallana* (84); *Codium tomentosum* (93); *Bryopsis hypnoides* (119); *Cladophora hutchinsiae* (124); *C. diffusa* (130); *Ulva latissima* (171); *Cladophora pellucida* (174); *C. rupestris* (158); *C. laetevirens* (190); *C. fulcata* (216); *Enteromorpha ramulosa* (245); *Cladophora fracta* (294); *Vaucheria velutina* (321); *Enteromorpha compressa* (335). By contrast, many of the blue-green algae portrayed are quite acceptably coloured—as in *Lyngbya majuscula* (62); *Rivularia nitida* (68); *Calothrix pannosa* (76); *Rivularia atra* (239); *Microcoleus anguiformis* (249); *Calothrix confervicola* (254); *C. caespitula* (305); *C. semiplena* (309); *Lyngbya ferruginea* (311). Others (for example *Lyngbya (Hormotrichum) cutleriae* (336)) would require additional tinting to achieve near-natural coloration.

There are certain outstanding examples of colour illustration amongst the red algae of the primary version. This is particularly true of the filamentous forms, where the difficulties of providing the natural colour variation patterns across plants that are inherent to large flat, ribbon-shaped, strap-shaped or undulant fronds with complex continuous surfaces are not so pronounced. Even amongst these latter there are some very sensitively rendered illustrations that support the occasionally expressed contention as to Reeve's considerable talent as a colour printer, who would go to immense trouble and expense to obtain realistic results (J. D. Hooker to Harvey, letter of 6 May 1845, quoted in full earlier).

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* Numbers quoted here represent those in the numerical order of issue, not those of the Synopsis.

All or a significant part of plates of red algae in the *Phycologia* under the following names and numbers provide fine examples to support the above opinion of Reeve's taking pains; the symbols (f) and (br) stand respectively for filamentous and broader fronds. This represents, of course, only a small proportion of those examples that could have been selected from the many available.

Delesseria hypoglossum (pl. 2; br); *Callithamnion gracillimum* (5; f); *Kallymenia (Kalymenia) reniformis* (13; br); *Gracilaria polycarpa (multipartita)* (15; br); *Griffithsia devoniensis* (16; f); *Seirospora griffithsiana* (21; f); *Delesseria ruscifolia* (26; br); *Wrangelia multifida* (27; f); *Microcladia glandulosa* (29; f); *Spyridia filamentosa* (46; f); *Bonnemaisonia asparagoides* (51; f); *Rhodymenia laciniata* (121; br); *Callithamnion tetragonum* (136; f); *Ceramium acanthonotum* (140; f); *Laurencia obtusa* (148; f); *Stenogramme interrupta* (157; br); *Callithamnion borreri* (159; f); *Polysiphonia urceolata* (167; f); *Rhodymenia jubata* (175; br); *Callithamnion turneri* (179; f); *Griffithsia secundiflora* (185; f); *Laurencia tenuissima* (198; f); *Dasya coccinea* (253; f); *Callithamnion pluma* (296; f); *Ceramium strictum* (334; f).

Other species amongst the Rhodophyta (red algae) are not well rendered, in many cases being far too biased towards the purple/violet, in others inaccurately coloured in various ways, blurred in detail, and/or often with poor morphological representation. Examples of these are also legion, but perhaps not so markedly so as are the better examples of art work in this context. A selection, personal in choice of course, is: *Odonthalia dentata* (pl. 34); *Rhodomela lycopodioides* (50); *Chondrus crispus* (63); *Delesseria sanguinea* (151); *Nitophyllum punctatum* (202); *Callithamnion arbuscula* (274); *Polysiphonia byssoides* (284); *Polysiphonia fastigiata* (299).

These examples are quoted from analysis of the primary version provided by a copy of the 3-volume numerical sequence bound as issued and not subsequently disturbed; by separate wrapped early parts that, almost by definition, contain the primary version of both text and plates; and from a 4-volume (resorted; systematic) copy of the complete work that textually—and therefore probably as to illustration—is wholly primary version.

Comparison of selected plates, from a 'New Edition', volume II (see Plate 10 for the form of the reissued title-page), that were clearly derived from later printing than the primary version and may well therefore have been printed *for* the 1871 issue as it was being prepared revealed generally deleterious changes. Printing in the main was greatly superior in the primary version; the lines were sharper, the colours mostly (but not always) more natural, the layering (wash) generally better aligned with the outline printing, the plant sections clearer and more carefully printed. Where parts of sections were differently emphasised for different purposes, they were commonly clearly so in the primary version, but often badly and generally obscurely over-coloured, blurred and smudgy in the 'New Edition' II—as, for example, in plate 85, fig. 9, where the primary version is beautifully clear, but the 'New Edition' represents a homogeneous splurge. Similar comparison was true for plates 34, 50 and 264, selected at random as appropriate further examples for the present analysis. A potential reason (over and above market-demand pressures) which is established as producing plate variation in at least two cases, is considered in section 2 (*B*) of the present Appendix (IV). From the tone of the evidence there presented, this could have been a more widespread source of significant difference.

The biggest overall problem, aside from colour variation and inconsistency, with almost all plates of all versions is one of cross-relationship of scale in the gross morphological sense, even given the size statements in the textual descriptions, providing some sort of basis for comparison. The realities of size comparison would have immeasurably complicated the situation for Harvey and his publishing associates, given the restrictions of paper size, space relations and continuous copy supply. It is a tribute to Harvey's grasp of the problems, despite the above, that the impressions given by the gross morphological renderings so frequently capture the essence of the plants through characteristics manifest in living relationships in the field.

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Charles Darwin's Notebooks, 1836–1844

TRANSCRIBED & EDITED BY

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Darwin's notebooks provide an invaluable record of his scientific thinking and, most importantly, the development of his theory of natural selection. This edition of the notebooks, prepared to the highest modern standards or textual editing, thus affords a unified view of Darwin's professional interests.

The *Red Notebook*, used on the voyage of H.M.S. *Beagle* and afterwards in England, contains Darwin's first evolutionary statements. In July of 1837, Darwin began his 'Transmutation Notebooks' (B–E) devoted to the solution ofthe species problem, and in the third notebook of this series he first formulated the theory of natural selection. To this can now be added another species notebook reconstructed from loose sheets; this 'Torn-Apart Notebook' represents the fifth Transmutation Notebook.

This volume also contains Notebook A on geology, Notebooks M and N on man and behaviour, and other notebook and manuscript materials from the period 1836–1844.

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